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USSR: Chemistry

28 JULY 1987

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SCIENCE & TECHNOLOGY

USSR: CHEMISTRY

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NEW SYNTHESIS OF BERBAN DERIVATIVES

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 291, No 6, Dec 86 (manuscript received 6 Jan 86) pp 1377-1378

[Article by A. A. Akhrem, Academician, BSSR Academy of Sciences, and Yu. G. Chernov, Institute of Bioorganic Chemistry, Belorussian SSR Academy of Sciences, Minsk]

[Abstract] 5, 6, 8, 8a, 9, 10, 13, 13a-Octahydro-11H-dibenzo[a, g]quinolysine-11-ones [shown by Formulas I and II] are key intermediates in the synthesis of alkaloids in the berberine series. Continuing previous studies, the authors developed a new method for synthesis of I and II enones. Enamino-lactams are reduced by lithium aluminum hydride in ether or tetrahydrofuran. Subsequent processing of the reaction mixture with methylvinyl ketone produces the enones with a yield of up to 84%. Structures were confirmed by IR spectra. References 8: 3 Russian, 5 Western.

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ION-SELECTIVE ELECTRODES

Moscow KHIMIYA: IONOSELEKTIVNYYE ELEKTRODY in Russian No 10, Oct 86 pp 1-3

[Authors: O.M. Petrukhin, Moscow Institute of Chemical Engineering imeni D.I. Mendeleev]

[Excerpts] Ion-selective electrodes have greater application in analytical chemistry. Especially prospective is their use in analyzing solutions in the metallurgical, chemical, pharmaceutical and food industries to measure effects on the environment.

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INTRODUCTION

In modern analytical chemistry, very diverse (along the lines of their potential) physical-chemical instruments were used: from monitors to control the composition of only one compound, for example, in technical solutions, to large and complex laboratory apparatuses for simultaneous determination of the concentrations of 10 elements. The problems which must be solved by analytical chemical methods are also diverse. Alongside traditional areas of their application in metallurgical and chemical industries, new areas have appeared, the importance of which is quickly increasing. These are analysis of substances in the environment in particular, and, also, control of the quality of food products. Ionometry in medical-biological studies has taken on great significance.

Developed a relatively short time ago, the method of ionometric analysis or potentiometry with ion-selective electrodes plays a marked role in applied analytical chemistry, regardless of competition with other methods of analysis. The goal of this short brochure is to show the possibilities of ionometry and key areas of its application.

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FORECASTING ENVIRONMENTAL TOXICITY WITH USE OF BIOCATALYTIC SYSTEMS

Kiev KHIMIYA I TEKHNLOGIYA VODY in Russian Vol 8, No 5, Sep-Oct 86
(manuscript received 26 Apr 85) pp 10-14

[Article by P.P. Gladyshev, Yu. A. Shapovalov and V.A. Kozlov, Institute of Chemical Sciences, SSR Academy of Sciences, Alma-Ata]

[Abstract] A study of the possibility of using enzymic analytic systems to predict toxicity of the environment and to carry out complex ecological expertise is described and discussed. A dynamic method of analysis was used with continuous and pulsed input of samples of toxic compounds into an enzymic analyzer. The analyzer automatically calculates weight coefficients of toxicity of all ingredients in objects being analyzed and characterizes their overall effect. Calculation of optimization of the analytic systems is presented and discussed. Use of the system to predict toxicity of the environment makes it possible to evaluate toxic compounds, to perform automatic analysis and to obtain results which can be correlated with the effect on living objects of the substances analyzed. The use of cholinesterase to detect organophosphorus compounds is cited as an example. Figures 5; references 2: 1 Russian, 1 Western.

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BOILER ACCIDENTS AT CHEMICAL PLANT

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 20 Dec 86 p 2

[Letter to the editor by A. Katyanin, Chief Inspector of the Boiler Inspection Department, Belgorod: "Postscripts to...Accidents"]

[Text] A hydrogen-air mixture exploded on 21 Dec 1985 at the Shebekinsk Chemical Plant. At that time, two workers perished. A commission appointed the same day by the Ministry of the Petroleum Refining and Petrochemical Industry established that the immediate reason for the explosion was the leakage of hydrogen through fissures in the pipes of the heat exchanger. A number of designers, equipment manufacturers and operators were named as the culprits. But because such installations are under the control of the State Committee for Supervision of Safe Working Practices in Industry and for Mine Supervision, a special inquiry was conducted: and were not our inspectors guilty here also? N. Sarafannikov, chief inspector of the Department of Chemical Inspection of the Administration of the Kursk-Belgorod Okrug, headed the commission. It was established that B. Perepelitsa, a former inspector of the Boiler Inspection Department, is one of those responsible for the incident.

An unfortunate accident, a grievous error of a conscientious worker? Alas, a dependable regularity. Perepelitsa, who twice examined the heat exchanger, was negligent to the highest degree in carrying out his duties: he did not check the main one--the conformity of the unit with the blueprints. The last inspection was 10 months before the explosion. The day of checking, if one believes the documents prepared by the inspector, he inspected six vessels. According to norms, 12 hours are required for this. The inspector found a way to manage it in 4 hours. The cleverness led to the fact that the inspector in haste did not notice such a defect of a metallurgical character, which could lead to even more dangerous results. The commission clearly determined this.

And the Shebekinsk ROVD [Regional Department of Internal Affairs] established that Perepelitsa "combined" the inspection with the reading of lectures--for which there was no charge--at the enterprises under his control.

For me, as the chief inspector of the boiler inspection department, all this was not news; the staff checks of the inspectors subordinate to me, including Perepelitsa, revealed cases of irresponsibility and negligence which in our

work is especially intolerable. Anticipating, I say: the management of the okrug (then headed by A. Vlasenko) did not only pay no attention to my reports. They even challenged my dissatisfaction as if my fault-finding was trivial. This led to the management secretary's being forbidden to record them.

A bribe from those under control, even though it would be in the form of payment for a lecture, is intolerable. I do not presume to judge whether there was a bribe or not. But--it is intolerable. What does the leadership of the okrug do? It throws Perepelitsa a "life saver": after the fact letter-petitions for lecture readings are composed, they are recorded nowhere although it is assumed that they are, but they turn up on Perepelitsa--with an authorization order.

As one of the culprits of such an accident, Perepelitsa must be answerable to criminal liability. But the Shebekinsk police delayed. The leadership of the okrug undertakes nothing. But Perepelitsa is freed. Naturally, "according to his own wish".

All is decorously noble. A trifle remained: a clear record of the guilt of Perepelitsa in the document of N. Sarafannikov's commission. It places the stigma on the brilliant dress uniform of the okrug! He needs to be removed! And in the cabinet of the new chief of the okrug G. Gorshkolepov, for a good two hours his deputy V. Nazarov tried to force us, the members of the commission, to give up our beliefs. It didn't happen.

There were also such cases previously.

A boiler accident occurred on 15 Sep 85 at the Krasnoyarsk sugar plant. The deputy chief of the okrug decided that it is not necessary to investigate the accident. Why? Perhaps it is a particular case? Indeed, at least 15 accidents occurred at the Krasnoyarsk plant from January 1982 to September 1985. And all with BQM-35M type boilers. My conclusions, which I communicated to the USSR Committee of People's Control, were simple: the Energomash manufacturing plant in Belgorod must urgently introduce the necessary structural changes in order to raise reliability. This demand produced a storm of negative emotion at the plant. Different papers went out in the name of the chief of the okrug A. Vlasenko in which they accused me of prejudice. It is strange, but Vlasenko also charged me with these same grievances. In the end, the machine builders introduced several changes. Persistence prevailed. But the label of a litigious, excessively carping person also stuck with me.

I shall not begin to enumerate the other examples of our disputes. I shall stress only that they have grounds which are no less based on principle. As I mentioned, I had to turn to the USSR Committee of People's Control. V. Zubenko, the deputy of the president of the State Committee for Supervision of Safe Working Practices in Industry and for Mine Supervision, came to verify the letter. He at once took his first steps in the direction of A. Vlasenko and those to whom adherence to principles is disagreeable. He literally checked everything and did not find a single authentic fact. Even in connection with accidents at the Krasnoyarsk plant.

Thus, a general meeting was rushed through: they say that Katyanin throws mud on our fine department and slanders it. How, then, did the events evolve further? At an accelerated pace: Vlasenko issues an order for my dismissal "for systematic nonperformance of duties without valid reasons". This punishment was so transparent that my first appeal to the office of the public prosecutor immediately produced an order for unconditional reinstatement in my job. It had to be submitted to the leadership of the okrug and they reinstated me. And shortly after, in order to keep me away from work, they appointed me...to deliver notices to youths undergoing pre-conscription military training! For all of three months. A courier with salary of 210 rubles--doesn't sound bad, really? What one does not do to annoy an obstinate person...

Vlasenko is now on a pension, but the new leaders also have continued the trend of embellishing the situation.

On 3 Feb 86, information was directed to A. Ponomarev, first secretary of the party oblast committee. In it, it was stated that "14 accidents of the second category were allowed at enterprises of the oblast during the 11th Five-Year Plan." The ZHURNAL REGISTRATSII AVARII, which is run by the management of the okrug, mentions 11 such accidents in all. And according to the data of my calculation, which I made as chief inspector, there were actually 21 of them.

Why is there such a multiplicity? There can be just one answer. The fewer the accidents, the greater the bonus. That is, objectively they urge number combinations on the boiler inspectors unscrupulously. Here is where the root of half truths and untruths lies. This is the reason why all kinds of measures are taken against those who disagree with such a course in order to pacify them and shut their mouths. The situation has also improved little in our time of sanitary changes. Different variations in placing me in a job have already been proposed. The previous striving to eliminate the one who washes dirty linen in public is viewed as specious pretexts.

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CSO: 1841/127

TURKMENISTAN CHEMICAL PLANT MANAGEMENT

Ashkhabad TURKMENSKAYA ISKRA in Russian 23 Dec 86 p 2

[Article by M. Asgarov, senior reviewer of the Department of Petroleum, Gas, and Chemical Industry of the Management of Activities of the TuSSR Council of Ministers under the "Opinion of a Specialist" rubric: "Management from Afar; In the Opinion of the Chemist M. Asgarov, There Are Extremely Appreciable Miscalculations Which Negatively Affect the Development of the Chemical Sectors in the Republic. He is Convinced That Their Leadership Should Give Integrity and Coordination"; first paragraph is TURKMENSKAYA ISKRA introduction]

[Text] By inaugurating a new rubric "Opinion of a Specialist", the newspaper expects a wide response from readers. We await letters from engineers, technologists, economists, and workers of all the sectors of the national economy on their burning and disturbing issues of the organization of production, management, planning, accounting, adoption of advanced and scientific and engineering achievements, and interrelations with subcontractors and partners. Today the first material under the new rubric is presented to the judgment of the readers.

The chemical industry of the republic arose and traditionally developed on the basis of exploitation of mineral resources. The Bekdash collective of the Karabogazsulfat Association mines sodium sulfate, epsomite, bischofite, and many other minerals from saline water and connate brines. The discovery of iodobromine waters enabled the production of iodine, bromine, and ferrous bromide to be organized at Cheleken and Nebit-Dag. Finally, sulfur reserves in the Gaurdak-Kugitangtau region served a reliable base for the development of the production of mineral fertilizers in the Chardzhou oblast.

The years have passed. A household chemical plant was opened in Ashkhabad. New shops were built at existing enterprises. The sector was reinforced and gained strength. But the process of establishing and developing it was far from painless. The problem of the improvement of the management of this sector arose acutely in proportion to the proliferation of industrial plants and the development of new forms of production.

Enterprises located in the territory of Turkmenistan, the southernmost republic of the USSR, were subordinate to the USSR Ministry of the Chemical

Industry, more accurately, unlike its All-Union associations dispersed in the USSR. Practically each plant and association had its own "boss", who also managed the collective under his jurisdiction in his own way, without taking into account the interests of the sector on the whole.

It is true that the Chemical Industry Administration existed at the TuSSR Council of Ministers up to the middle of the 1960's, although it distributed power purely at a minimum, i.e., did not have in its disposal the limits of capital investments and capital for material and technical resources but just the same coordinated the activity of the enterprises and attempted to solve both current and long-range problems. There was the possibility of analyzing and generalizing the results of the work of the sector, and this is important for competent and effective leadership.

With the abolishment of the [Chemical Industry] Administration, the matter became complicated. The pluses and minuses of "leadership from afar" are well-known, perhaps, to the collectives of the enterprises of All-Union subordination. On the one hand, the "bosses" are somewhat richer in resources, besides, to scrutinize deeply the operation of local enterprises there which are not scrutinized above--more simply, it is easier to know how the work is going. On the other hand, however, it is simpler--but this does not at all mean better. From time to time, elementary questions developed into difficultly solvable problems, the long-range plans were obscured, and the maneuverability of the labor force and materials was almost completely excluded: the ministry is one, but the All-Union production associations are diverse, and cooperative discussion of tasks and goals did not take place.

With the separation from the Ministry of the Chemical Industry of the Ministry for the Production of Fertilizers, the volume of papers sent to Moscow and the newly formed All-Union production associations doubled, and the rate and quality of reaction to them was correspondingly halved. Under conditions of difficult situations, economists were forced to turn to the departments of the Council of Ministers of the republic.

Last year dozens of telegrams were addressed to the USSR ministries. For what problems? They requested, in particular, the Ministry of the Chemical Industry to manufacture equipment for the Karabogazsulfat Association, to accelerate the development of planning estimates and to increase capital for spare parts. They were concerned with the construction of roofed storehouses, they extended the period of use of an old moorage in Bekdash, and they insisted on the allocation of additional capital investments. And so forth, and so forth.

Of the requests received, some half of the problems have been resolved.

But we shall say straight out that the chain of command: enterprise--Council of Ministers--USSR ministry--suffers from obvious flaws. Not accidentally the efficiency of the work of the industry of the chemical sector and of mineral fertilizers in the 11th and the beginning of the 12th Five-Year Plan leaves something better to be desired.

For the period 1981-1985, [words illegible] enterprise of these sectors did not achieve the rates of growth of production specified by the plan. At the Nebit-Dag iodine plant, the production volume fell by 22.9 percent to the 1980 level. The production volume at the Ashkhabad household chemical plant dropped somewhat.

The shipments of technical iodine, ferrous bromide, iodoform, sodium sulfate, household chemical goods, mineral fertilizers, sulfuric acid, sulfur, and celestine concentrate were disrupted considerably. On the other hand, the Gaurdak Sulfur Plant imeni 50th Anniversary of the TuSSR turned out 25,000 cubic meters above plan of "gyush" [gypsum?] rock during the last 5-Year Plan.

It appears that one must not be reassured by such a kind of "success". According to the chief and basic indicators, the final results are low. The leadership of capital construction is not at a high level in the sector, and therefore disturbances in the time periods for introduction and development of new industrial plants have become the rule.

The Karabogazsulfat Association postponed the start-up period of plants for the production of bischofite, sodium sulfate, and epsomite from the 11th to the 12th Five-Year Plan. Projects of the establishment of a raw material base, renovation, drilling of oil wells, and the construction of a shop for the production of 600 tons of a new form of output, etc. are excluded from the title list of the Cheleken Chemical Plant.

The lag in production construction at the Chardzhou chemical, the Gaurdak sulfur, and the Turkmen nitrogen fertilizer plants is allowed. The Turkmen Nitrogen Fertilizer Plant generally was erected in a strange way: they began from a shop for the final product--ammonium nitrate, in order to report more rapidly: there are, they say, finished mineral fertilizers. Subsequently a raw material--liquid ammonia--shop was constructed, and the last-mentioned phase was undertaken as the final. To sum up, the enterprise did not work normally for a month after operation was begun, which constantly encountered a shortage of ammonia, and then also of steam.

Today the Soyuzazot All-Union Production Association, of course, is taking some measures to correct the situation. But where was it earlier, why was the course of the leadership of the Turkmen Nitrogen Fertilizer Plant not interfered with and not required to change? Why did the Ministry of the Chemical Industry not oppose the proposal to duplicate the Gulf of Kara-Bogaz-Gol dam? Bekdash chemists interceded for a unique storehouse for the essentials of their own future. They went to different people high in the chain of command.

A voluntary approach to the matter overcame again, and deliberations prevailed, but at the same time, immediate advantages are extremely doubtful. Turkmen geologists now observe how the gulf is constantly being converted into a salt desert. Difficulties inevitably arose in the work of the Karabogazsulfat Association. In the opinion of specialists, it is necessary in a brief period of time to construct a capital water transporting installation, which makes it possible to establish a reserve of surface natural brine of not less than 15,000 cubic meters. But neither the Ministry

of the Chemical Industry nor the All-Union Halurgy Research Institute has taken energetic steps toward the solution of a most urgent problem.

The interrelations of chemists with science are extremely complex and inadequate. Before 1984, the Leningrad All-Union Halurgy Research and Planning Institute (VNIIG) studied the problems of the Kara-Bogaz-Gol Gulf. It is subordinate to the Mineral Fertilizer Ministry, at the same time as Karabogazsulfat belongs to the Ministry of the Chemical Industry. For purposes of elimination of departmental separateness, the ministry transferred planning of the projects of the Turkmen association and part of the scientific sphere to the Kharkov association. However, the sulfate sphere as before remained with the VNIIG. With two scientific "nurses", the main task was not fulfilled--the integrated extraction and use of valuable and rare components of natural brine.

The chemists of Cheleken and Nebit-Dag and the sulfur recovery workers of Gaurdak and other collectives have no fewer problems. As is well-known, an important "Quality" target program is vigorously in progress in the sector. But by virtue of imperfection of the technology of the extraction of iodine from mineralized waters and the absence of effective packings and adsorption columns, it is impossible to obtain pure iodine. The recommendations of the scientists on that score were ignored and miscalculated. There are no proposals which would guarantee the stability of brine conduit pipes and joints of the equipment against a corrosive medium. In Gaurdak, the output coefficient of sulfur of underground melting is low.

In a word, the contribution of staff members of dozens of scientific research institutes and bureaus to the solution of long-range and day-to-day scientific and engineering problems of the sector up to now has not been great. It could be weightier if they would skillfully manage the development of the chemical industry, the production of mineral fertilizers, and the petrochemical sector of the republic, maintaining it under control by helping it in all spheres of activity and combining sector and regional principles of management. The republic repeatedly went to the USSR ministries with a proposal to restore the work of the coordinating and directing center of the chemical industry in Turkmenistan. This problem also does not lose urgency today. The republic produces 35 percent of the sodium sulfate and a considerable part of the iodine and bromine which is obtained in the USSR as a whole and is the only supplier of magnesium chloride, epsomite, and medicinal Glauber's salt. The mineral fertilizer industry is supplemented by a Central Asia potash plant in the 12th Five-Year Plan.

Plans for capital construction are vast and intense. It is necessary to expand existing and erect new productions, to lay out pipelines and power transmission lines, to drill an enormous number of raw material boreholes, and to utilize tens of millions of rubles for these purposes. Tasks of coordination of capital construction in the sector of reinforcing the material and technical base of contract organizations, and of strengthening their industrial plants are urgent in this connection. Each enterprise of All-Union subordination separately will not be able to solve these problems in isolation.

That is the reason why, in our opinion, it is necessary to introduce corrections in the plan of the General Plan for the Development of the USSR Chemical Industry in order to form in Turkmenistan management or an association (not only in name), which would take in its hands the leadership of the important sectors of the national economy.

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NEW WAVE-IMPULSE LABORATORY PROPOSED AT NPO 'POISK'

Moscow KHIMIYA I ZHIZN in Russian No 9, Sep 86 p 18

[Text] KHIMIYA I ZHIZN has reportedly written about wave-impulse technology (EIPOC) which will provide for a sharp reduction in expenditures on manual labor to combat ice formation, to clean surfaces, etc. The most recent article on this topic (1986, No 7) was entitled, "There Is an Impulse; We Need a Practical Approach." It primarily discussed how the industrial output of electroimpulse equipment has not been organized yet even though many sectors of the national economy are interested in it and the subjects of laboratory research are determined by a single department. "The solution of problems on the national scale," stated the editor in his concluding remarks, "will allow us to free 10,000 workers from hard physical labor and to obtain many millions in savings. Here, not only simple attention and good words are required, but help and real support--it is possible, in the view of the USSR Academy of Sciences and of GOSKOMIZOBRETENIYA."

With satisfaction, we report that by order of the chairman of the State Committee for Inventions and Discoveries, I. S. Nayashkov, a laboratory of wave-impulse technology under the direction of the inventor I. A. Levinyy will be set up as part of NPO [Scientific Production Association] "Poisk". The goal will be to guarantee widespread introduction of inventions into the national economy.

And so, the practical approach has come through. However, the question remains open: who will provide the electroimpulse technology Soviet engineers agree is of top priority, and where? As soon as the question is answered, our editor will inform the readers.

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CHEMICAL INDUSTRY

ILLEGAL ACTIVITY OF CHEMICAL EXECUTIVES

Moscow IZVESTIYA in Russian 18 Sep 86 p 6

[Unattributed article: "Causes and Effect"]

[Text] The Office of the USSR Prosecutor has organized an investigation into the execution of administrative legislation and laws, concerning the protection of socialist property, in the area governed by the Ministry of Chemical Industry of the USSR.

It has been established that attempts to eradicate embezzlement, wasteful management, and disciplinary infractions are only slowly being implemented in the chemical industry. The industry suffers significant losses from misappropriation and other shortcomings. The worst situation, in preserving public property, has occurred in the following plants: "Soyuzanilprom", "Soyuzbytkhim", "Soyuzkhimplast" and "Soyuzkhimvolokno", where the losses rose by a factor of 1.7, above those of 1984.

The Ministry and its subordinate directors of the All-Union industrial associations did not take special measures to implement the demands of resolution No. 299 of 4-11-85, issued by the USSR Council of Ministers regarding "Additional Measures to Improve Accounting in the National Economy". As a result of their not adhering to the Council's resolution, the accounting, material inventories, monetary goods and general control are in bad shape throughout branches of the industry.

Serious shortcomings were revealed in the establishment of initial and subsequent inventories, and in corrective measures of the follow-ups. A list of plants heading this category, is as follows: PA (Production Association) "Tomskpolimir", Crimea PA "Titan", Volzhsk PA "Khimvolokno", Kaluga PA "Khlorvinyl", Kemerov Scientific PA "Karbolit". Also included are several other plants not mentioned here. Frequently, lack of accounting has contributed to the embezzlement and misappropriation by the people in charge.

In the offices of the Ministry and in the VPA [Volzhsk Production Association] a fallacious, anti-State policy of artificial cross-checks and inspections has been utilised. This deceptive practice has led to cover ups of profiteering and hiding of the perpetrators. The process of inspections doesn't encompass explanation of the causes and conditions that contribute to the theft and embezzlement of goods, mismanagement and losses due to

unproductivity. Explanations are also lacking as to the role of the managers of the associations and enterprises in the administration of the plants.

The Inspection Department of the Ministry has been lax, and has not shown any signs of taking appropriate measures towards the implementation of improved control and inspection (in the whole system).

In 1984, the Office of the USSR Prosecutor drew attention of the Ministry's leaders to the necessity of taking corrective steps to secure proper use and storage of newly shipped equipment, not yet installed. However, the situation has not changed, and in many enterprises of the association, the organizational and technical arrangements to improve the conditions of storage and rational use of equipment have not been fulfilled satisfactory. Additionally, assignments to reduce stock have been neglected.

In the months of May and June of 1984, a set of automatic manipulators, named "Cyclone", was shipped to the Barnaul Association "Khimvolokno". They were unloaded onto an open dock along with the garbage, which was to be disposed. Because no measures were taken to store them safely, the expensive equipment was disassembled and rendered unfit for use. Similar occurrences were being noticed in the Mogilev PA "Khimvolokno", the Novopolotsk Association "Polimir", Usolsk PA "Khimprom", Leningrad SPA "Pigment", SPA "Uzbytplastik" and several other enterprises.

A recently identified situation, concerning misuse of equipment, is partially due to shortcomings in planning and placing equipment orders, and also partially to a group of managers, who let the production go unsupervised.

Leaders in the Ministry's staff did not take proper measures to strictly follow the Party's principles, demands and legislation, designed to select a staff of managers, who would be responsible for materials management, and the works of bookkeepers and accountants. Quite often, lackadaisical people were being nominated for those positions, which subsequently led to misappropriation of public property. For a long time, Director of Dzerzhinskiy's PA "Kaproaktam", Struzhko, and other people in charge, have been engaged in embezzling, bribery, and malfeasance of their posts. The nation's treasury has lost more than 400,000 rubles because of their criminal activity. A director of the Social Services of the Ministry's Domestic Administration Department had been taking bribes and, because he was found guilty of criminal offences, he was sentenced and jailed.

The number of occurrences of embezzlement and misuse of public posts and similar crimes has grown twice as high in 1985 as compared to 1983, throughout the enterprises of the industrial branch.

The Ministry is not taking appropriate measures to improve quality of production. This year, the Syzran PA "Plastik" sent 250,000 defective products to VAZu. Poor quality production is routinely being sent to VAZu by Yaroslavl Association "Lakokraska" and Kirovokansk NPA "Polimerkley". Automobile, tractor and other manufacturing companies have presented valid and

substantiated complaints due to poor quality products made by Lida, Riga and Zagorsk Varnish and Paint Plants, as well as Cherkassy Chemical Association.

The enterprises and associations of the Chemical Industry do not precisely follow State regulations demanding on-time order delivery. Last year, 70% of the branch's enterprises had not fulfilled consumer contracts.

The Kuskov Chemical Plant, Savyanskoye PA "Khimprom", PA "Navoiyazot", Crimea PA "Titan", "Soyuzkhlor" and "Soyuzbytkhim" enterprises have repeatedly allowed deliveries to be delayed or skipped altogether.

The Ministry's managers had not taken measures to stop violations of the plan's deadlines, which, in turn, led to a persistently faulty and illegitimate way of devitalizing the plan until it became downscaled. The changes in the production plans of "Soyuzkhlor" and "Soyuzkhimvolokno", "Soyuzkraska" and "Soyuzneorganika" were introduced only in the last quarter of 1986.

The legal aspects of labor are barely touched in the branches. The Ministry's judicial services do not have a program for legal protection of the enterprises' and branch's associations. The Accounting, Inspection and Legal Services of the Ministry, the enterprises and the associations do not have sufficient plans to repair damages and shortages made by the embezzlers. Among the Industrial Ministries, the Chemical Industry has taken last place in the competition for the replacement of the material losses, inflicted by legal violations.

The branch's work collectives do not pay enough attention to bring law and order into the workplace. The level of work discipline is very low in the several enterprises. A slackening in maintaining in-plant work discipline and technological demands has been observed. This, consequently, causes a stoppage in production and irregularities in output; also, it interrupts the fulfilling of the plan's established goals.

As a result of the prosecutors' investigation, a number of measures have been undertaken in order to eliminate identified, legal violations of the law. Criminal law suits are being instituted, and a follow-up is being conducted, in cases of revealed material misuse, destruction of equipment and mismanagement. The guilty parties are being held on the grounds of disciplinary accountability and, in suitable cases, forced to repay for material losses inflicted upon the State.

The Office of the USSR Prosecutor has presented a resolution to the Ministry of Chemical Industry, aimed at eliminating the causes and conditions leading to nonobservance of the law in the departments of the branch. This resolution has been discussed at the meeting of the Ministry Collegium, in which the USSR General Prosecutor, comrade A.M. Rekunov, participated.

The Collegium demanded from the managers of the Ministry's subdivisions and All-Union industrial associations that they increase personal responsibility in the elimination of the mismanagement and wastefulness, in the

protection of public property, and in strengthening departmental discipline, as well as eradication of anti-State practice of sham intra-inspections. In the wake of this resolution, a director of the Ministry Inspectorate, N.M. Filipoov, was fired because of indolence and incompetency in his work.

The Ministry has set up a series of organizational and technical measures, intended to bring appropriate order in the branch's enterprises, and to secure legal performance of administrative duties.

As a result of the inspection done in the Ministry of Chemical Industry of the USSR by the Office of the USSR Prosecutor, the latter has taken measures to increase surveillance of the maintenance of administrative legislation in that branch.

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IMPROVEMENTS IN PRODUCTION OF OILFIELD MACHINERY

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 22 Nov 86 p 2

[Article by special correspondent D. Melikov: "Mood for a Change"]

[Text] "The principal suppliers of equipment for our industry--the Azerbaijan machinebuilding plants--violate, with alarming regularity, the equipment delivery schedules. The quality of their machines could also stand improvements", said Deputy Minister of the Petroleum Industry V. Sokolov, commenting on a series of reports under the rubric "Oilfields Await New Equipment" (Source paper, 9 Jan). The unsatisfactory performance of the Baku enterprises of the Glavneftemash [Main Administration of Petroleum Machinebuilding of the USSR Ministry of Petroleum Industry] was also reported in "Quality Put to the Test" (January 22nd), "For Effectiveness or for Volume?" [Dlya Dela ili dlya Vala?] (February 5th), and "The Market is Demanding, Correct" [Spros Strogiy, Spravedlivyy] (February 22nd).

While preparing this article, I spent some time at several Glavneftemash enterprises that have been criticized in our articles. I met new managers at three of them. A total of six managers of plants and organizations were removed from office. A fine, amounting to a month's salary, was imposed on twenty officials. The management of the Main Administration itself was also strengthened. In a word, the measures against negligent managers are quite harsh. And what are the results?

The beginning of good changes can be seen at the Kishlinsk Machinebuilding Plant, which has been the subject of especially sharp criticism because of its low-quality reducing gears [reduktor] for oil-pumping jacks. V. Akhmedov, the recently appointed head of the enterprise, does not hide his satisfaction: the Tyumen oil workers gave a positive evaluation of the Baku reducing gears. The certification board has just awarded them the State Badge of Quality that they had lost a year ago.

The problem of production increase and quality improvement of reduction gears is being solved with the future in mind. V. Lukyanenko, Minister of Chemical and Petroleum Machinebuilding, has issued a directive regarding the specialization of this plant in the production of these items. In this manner, a solid base is being established for the intensification of mechanized crude-oil production at the West Siberian oilfields.

Only recently, one could see at the Machinebuilding Plant imeni V.I. Lenin piles of defective gearboxes--the main product of the plant. The customers (oil workers) used to return them by the dozen every month for correction of defects. Now, every case of a returned gearbox is treated as an extraordinary event. There are practically no complaints regarding quality. A single production line for assembling and testing of gearboxes is being created.

Speaking about the changes, the new manager of the plant, T. Mamedov, related the following episode. It was learned one evening that assembly parts for the night shift had not been delivered by a neighboring enterprise. Previously, the neighbors most likely would not have treated such a "small" thing seriously. "Too bad", they would have thought, "We shall deliver them in the morning". This time, the reaction to the telephone call was quick. The necessary parts were in the shop in one hour.

But the attitude of the management of the Plant imeni P. Montin is, so-to-speak, below par. They failed to fulfill the oilfield machinery production plan. And there were no good reasons for it. Internal problems were blamed. We talked about these problems with the leader of the foundry brigade Sabir Musayev, a USSR State Prize winner.

"One must honestly admit that we still do not have a sufficient sense of responsibility", says the leading worker. "Sometimes words differ from facts. This applies in particular to the question of technical progress."

No need to look far for an example. Musayev's brigade was the first in the industry to master the production of high-strength cast-iron gate-valve parts. However, the innovation has been accepted on a less than modest scale. The brigade can already produce today, up to 170 tons of such parts, but it produces only one-half of that. The implementation of this leading technology is held back artificially. Plant engineers propose to make the enterprise a base for the use of high-strength cast iron in the petroleum industry machinebuilding. But thus far this subject has not progressed beyond the discussion stage.

Yes, changes do not occur smoothly at all Glavneftemash plants. Try as they might, such large enterprises as the Plant imeni Leytenant Shmidt and the Bakinskiy Rabochyy Plant have not been able to find a normal operating rhythm. Nevertheless, there certainly are perceptible changes for the better.

Strict incoming control, the absence of which we have reported, has been introduced everywhere. Whereas, formerly, subcontractors, bound by affiliated deliveries, frequently closed their eyes to defects, this is no longer true. The time of mutual nonaccountability is over. In the Main Administration as a whole, the acceptance of products on first delivery has attained 85 percent. There are enterprises that have not had any complaints from the customers during the last six months.

An overall program, "Quality", developed by Minkhimmash [Ministry of Chemical Machinery] and the Azerbaydzhan CP Central Committee, is being implemented. Introduced within its framework are more than 100 digital-computer-controlled

machine tools, eight robot-controlled complexes and the same number of automatic and continuous production lines. Finally, a service center for computer-controlled machine tools has been opened in Baku.

Organization of maintenance and repair of oilfield equipment at the North of Tyumen, where machinebuilders have established their depot, has become a key point in new relations with the users. If something becomes unserviceable or is lost or broken in shipment, the equipment is furnished with new parts and tested, and only then is it sent to the oil fields.

The present head of the main administration believes that, in addition to acceleration of modernization of equipment, the most important thing today is strengthening labor and technological discipline and increasing personal responsibility of managers. Well, one can only welcome such an attitude.

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INCREASED OUTPUT FROM OIL REFINING AND PETROCHEMICAL INDUSTRIES ANTICIPATED

Moscow KAUCHUK I REZINA in Russian No 11, Nov 86 pp 2-4

[Article by Supplied by Press Center, Central Scientific Research Institute of Information and Technical-Economic Studies in the Oil Refining and Petrochemical Industry]

[Abstract] Workers in the oil refining and petrochemical industry have achieved great successes in socialist competition, increasing output by 2.7% in 1985 and over-fulfilling the production plan by 64.5 million rubles, including 9.7 million rubles excess production of consumer goods. The 27th CPSU Congress set forth new goals for increasing production of consumer goods, expanding the assortment and improving the quality of consumer goods. Examples of plants which are producing larger quantities of consumer goods are cited, including the Yefremov Synthetic Rubber Plant which has exceeded its goal by 117.9%, the Kirov Tire Plant, which has introduced new types of tires, and the Sumgait Synthetic Rubber Plant, which has increased its consumer good production from 0.1% to 0.5% of total output, doubling the assortment of goods produced. Many other enterprises have also pledged to increase output and improve quality of consumer goods.

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ALL-UNION SOCIALIST COMPETITION IN CHEMICAL AND PETROLEUM MACHINE CONSTRUCTION

Moscow KHIMICHESKOYE I NEFTYANOYE MASHINOSTROYENIYE in Russian No 12, Dec 86 pp 36-37

[News item]

[Abstract] Staff of the Ministry of Chemical and Petroleum Machine Construction and the Presidium of the Central Committee of the Labor Union decided 27 Aug 86 to announce an All-Union Socialistic Competition among all collectives covered by above bodies. The goal of this competition is to improve productivity and quality of the products, to increase economy of resources, fulfill all agreements, improve discipline and mobilize all competitors. A number of subclasses was identified: production, scientific

research, design and development, construction and various technical specialties in which the competition would be handled. Competitors are to be evaluated quarterly, semiannually, annually and every five years. Beside financial rewards, the winners will be awarded a travelling banner prize.

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658.324.2

LARGE SCALE AND SUMY EXPERIMENTS. COMMUNICATION 3. INCENTIVE PROGRAM FUNDS

Moscow KHIMICHESKOYE I NEFTYANOYE MASHINOSTROYENIYE in Russian No 12, Dec 86
pp 26-28

[Article by A. Ya. Daugello, deputy director of Main Planning Economic Administration of the Ministry of Chemical Machinery]

[Abstract] Incentive program funds are created to improve economic indices of performed labor and efficiency of plants through material rewards to organizations and individuals. In large scale projects these incentive funds should be related to increased productivity with diminishing losses. In the Sumy Petroleum Processing Plant imeni M. V. Frunze, the incentive funds were based on net annual profit; this stimulated the workers to high productivity and high efficiency. Depending on special needs, additional funds could be allocated to stimulate special projects. Obviously, with cost overruns, respective penalties are imposed on the incentive funds. Combined incentive funds are distributed according to the decisions of the program participants: construction of living quarters, schools, rest camps, etc. The system based on net annual profit as practiced by the M. V. Frunze Plant appears to be more effective.

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CERTIFICATION OF WORK STATIONS--RESERVES FOR INCREASED PRODUCTIVITY

Moscow KHIMICHESKOYE I NEFTYANOYE MASHINOSTROYENIYE in Russian No 21, Dec 86
pp 28-30

[Article by V. V. Fomenko, engineer]

[Abstract] In 1984 a certification commission was set up at the Production Association "Uralgidromash" consisting of technical specialists and representatives of union, party and comsomol organizations. The commission addressed each working site for certification, modification or liquidation. By liquidating nonproductive work sites, labor reserves were liberated for other jobs. The overall program consists of four stages: inventory of jobs,

certification, verification and implementation. By January 1986, work sites were identified with the following results: 1121 were certified fully, 1282 required modifications and 17 were liquidated. Five general classes of necessary measures were recognized: improvement in labor conditions, replacement of old equipment, repair and modernization of equipment, review of outdated standards and automation of procedures. Review of specific tasks resulted in the ability of individual workers to handle several machines, eliminated necessity of moving within the factory units being constructed and improved overall productivity.

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LASER DEPOSITION OF MATERIALS FROM VAPOR PHASE

Moscow POVERKHNOST in Russian No 1, Jan 87 (manuscript received 20 Mar 1986)
pp 141-142

[Article by L. A. Ryabova, Yu. D. Kalafati, I. A. Serbinov, V. S. Salun and K. V. Borman, Institute of Radiotechnology and Electronics, USSR Academy of Sciences, Moscow]

[Abstract] Results are given for preparation of microstructures from the vapor decompositions of iron pentacarbonyl and acetone with laser irradiation. Laser of $\lambda = 0.53 \mu\text{m}$ with up to 1 W power was used. Glass, mica and sittal were the substrates. Strips of iron oxide with width 100 to 500 μm were obtained during destruction of iron pentacarbonyl vapors, depending on the irradiation power. Graphite rods of 40 μm diameter and 2-3 mm height were obtained from decomposition of acetone. Electron diffraction studies showed the rods to have a polycrystalline structure. The stationary growth rate of graphite rods depends on the radiation power and is linear. If the optical properties of the growing material are different from those of the substrate, the initial stage of growth is not linear. On sittal, the rods began to grow after forming a crater. For mica, the substrate was decomposed at the beginning and the place of decomposition was grown over with graphite on which later a smooth rod developed. On glass, graphite rods were fused in the substrate. It was established that the adhesive strength of the attachment of the grown rods to the substrate determined the initial stage of growth. Figures 2; references 5: 1 Russian, 4 Western.

12886/9716

CSO: 1841/183

UDC 534.222.2

EFFECT OF DEGREE OF DISPERSION AND INITIAL TEMPERATURE OF CONDENSED PHASE ON
STRUCTURE OF DETONATION WAVE IN AEROSOLS

Moscow KHIMICHESKAYA FIZIKA in Russian Vol 5, No 10, Oct 86 (manuscript
received 3 Oct 85) pp 1431-1434

[Article by V.A. Kopotev, N.M. Kuznetsov and S.A. Tsyganov, Institute of
Chemical Physics, USSR Academy of Sciences, Moscow]

[Abstract] A mathematical study of the structure of a detonation wave in aerosuspensions of pyrolyzing fuel particles as a function of the initial temperature and the particle size involved development of a model of detonation combustion of pyrolyzing fuel particles and examination of a case in which pyrolysis proceeds without melting and the particles become porous and a case in which pyrolysis is accompanied by melting of the substance. In pyrolysis without melting, combustion occurred more quickly and the wave width was less than that in pyrolysis with melting. This is due to the fact that blocking of the heat flow produces a temperature on the particle surface which is 100-200 K higher than that in the case without melting. This and the exponential dependence of the rate constant of pyrolysis on the temperature increased the pyrolysis rate. The width of the stationary zone of the detonation wave depended slightly on the initial particle temperature (in the range studied) but greatly on the initial particle size. Thus, the possibility of a detonation regime of combustion of the particles is determined to a much greater degree by particle size than by the initial particle temperature. Figures 2; references 5: 4 Russian, 1 Western.

2791/9716

CSO: 1841/58

EXPLOSIVE-SAFE FORMULATION OF PROCESSES FOR PRODUCTION AND TREATMENT OF DUSTING FUELS

Moscow PLASTICHESKIYE MASSY in Russian No 1, Jan 87 pp 55-56

[Article by L. V. Novikova, Z.M. Norka, L. N. Chayka and V.K. Bitvutskiy]

[Abstract] The use of nitrogen atmospheres or completely-surrounding equipment apertures with protective caps and covers may be economically unjustified. Therefore, combined methods must be used to formulate processes for production and treatment of explosive powders. The basis of these methods is that the explosive properties of the mixtures are changed as a function of oxygen content, which is maintained so that the explosive velocity and pressure in the equipment are low and explosion protective equipment can suppress the possibility of explosion. This combined method of reducing oxygen content without eliminating it completely and protecting against explosions by mechanical means under the low-oxygen conditions allows ordinary equipment to become explosion safe. Figures 2.

6508/9716

CSO: 1841/176

UDC 539.19+541.124/127

CHAIN BRANCHED REACTION $\text{NF}_2 + \text{H}_2\text{O}_2$

Moscow KHIMICHESKAYA FIZIKA in Russian Vol 5, No 12, Dec 86 (manuscript received 24 Dec 1985) pp 1639-1642

[Article by Yu. R. Bedzhanyan, Yu. M. Gershenzon, O. P. Kishkovich and V. B. Rozenshteyn, Institute of Chemical Physics, USSR Academy of Sciences, Moscow]

[Abstract] The chain branched reaction of $\text{NF}_2 + \text{H}_2\text{O}_2$ was studied. HF_2 was obtained from N_2F_4 in a furnace at $\approx 500^\circ\text{K}$ and mixed with H_2O_2 . The reaction was studied at room temperature and at a pressure of the He gas carrier of 10-20 torr. In an excess of H_2O_2 over NF_2 , the reaction scheme is described in five equations (k_0 to k_4) with chain origin (k_0), chain branching (k_1), chain continuance (k_2 and k_3), and chain termination (k_4). After HO_2 is formed in k_0 , $\text{NF}_2 + \text{HO}_2$ proceeds in k_1 with formation of atoms F and radicals OH both of which react with H_2O_2 in k_2 and k_3 to produce HO_2 which is destroyed in k_4 . This was demonstrated with spectrometer EPR/LMR by measuring concentration of NF_2 and HO_2 . Kinetic relations for NF_2 and HO_2 , obtained near the limit of autoignition, were treated according to the theory of chain branched reactions of Semenov (ref.1). Values for the rate constants of the reactions of chain branching (k_1) and chain termination (k_4) agree with the values measured in separate experiments by direct methods. They are $k_1 = (2.6 \pm 0.4) \cdot 10^{-12} \text{ cm}^3/\text{s}$, $k_4 = (12 \pm 4)/\text{s}$ and $k_1 = (2.4 \pm 0.6) \cdot 10^{-12} \text{ cm}^3/\text{s}$, $k_4 = 10^{-15}/\text{s}$. Calculated values were $k_0 = 1.5 \cdot 10^{-17} \text{ cm}^3/\text{s}$,

$k_1 = 2.4 \cdot 10^{-12} \text{ cm}^3/\text{s}$ and $k_4 = 11/\text{s}$. The kinetic relations for NF_2 and the branching active center HO_2 are described well by Semenov's theory. Figures 3; references 1 (Russian).

12886/9716
CSO: 1841/184

UDC 541.124.13

ESTIMATION OF CRITICAL ENERGY OF INITIATION OF DETONATION IN GAS SYSTEMS BY IGNITION LAG

Moscow KHIMICHESKAYA FIZIKA in Russian Vol 5, No 12, Dec 86 (manuscript received 17 Dec 1985) pp 1683-1689

[Article by A. A. Borisov, V.M. Zamanskiy, V. V. Lisianskiy, G.I. Skachkov and K. Ya. Troshin, Institute of Chemical Physics, USSR Academy of Sciences, Moscow]

[Abstract] Estimation of E_* , the minimum energy of initiation of detonation in various gas systems, was accomplished using experimentally-measured values of ignition lag. On the basis of an analysis of a two-front model of detonation and data for the average size of the nucleus of detonation wave in the mixture $2\text{H}_2 + \text{O}_2$, an expression was obtained for calculating E_* in gas systems. $E_* = k\tau^3$ was established where τ is the ignition lag and k is a proportionality constant. A formula for calculating k is proposed. For mixtures of CH_4 , C_2H_4 , C_2H_6 and C_3H_8 with air, the values for $k \cdot 10^{-20}$ were 3.8, 5.0, 3.6 and 4.3 joule/s³. These values for the hydrocarbons are similar. For estimating E_* for stoichiometric hydrocarbon-air mixtures, an average value of $k = 4.2 \cdot 10^{20} \text{ joule/s}^3$ can be used. On the basis of literature analysis and literature experimental data, formulas were developed for calculating τ in mixtures of C_2H_6 , C_2H_4 , and C_3H_8 with air and O_2 . E_* values for stoichiometric air mixtures of CH_4 , C_2H_6 , C_2H_4 and C_3H_8 were estimated. The calculated values of E_* with calculated τ and k values were 0.018, 0.007 and 0.070 kG TNT for C_2H_6 , C_2H_4 and C_3H_8 , which were lower than experimental values of 0.035, 0.016 and 0.160, respectively, and can be explained by several causes. With the proposed formulas, the effect of small additions of promoting or inhibiting substances on E_* of gas systems can be estimated. With small amounts of additives (up to 10% of the fuel), the thermodynamic and physical properties of the mixtures are not altered much and neither is k . Under these conditions the change in E_* can be determined for a change in τ . Small amounts of additives can have a significant effect on E_* . Figures 3; references 34: 12 Russian, 22 Western.

12886/9716
CSO: 1841/184

ANALYSIS OF STABILITY OF LAMINAR FLAME FRONT

Moscow KHIMICHESKAYA FIZIKA in Russian Vol 5, No 12, Dec 86 (manuscript received 5 Mar 1985) pp 1690-1695

[Article by P. P. Lazarev and A. S. Pleshanov, State Scientific-Research Power Institute imeni G. M. Krzhizhanovskiy, Moscow]

[Abstract] The stability of a laminar front of a flame is examined with a mathematical analysis for its modeling. Boundaries of stability for various conditions are given relating the dimensionless energy of activation with the Peclet No. (Pe). The analysis is made to resolve the discrepancy in the magnitude of the critical value Pe_* with that observed experimentally. Calculation of continuum of streams of total number of atoms in a flame front increases the critical Peclet No. Pe_* up to $\sim 10^2$ for the basic boundary of linear stability. Calculation of non-linear stability at real values of dimensionless activation energy of up to ~ 10 increases Pe_* up to $\sim 10^3$, which corresponds with the experimental data. With this, a neutral boundary of stability is absent. Figure 1; references 12: 10 Russian, 2 Western.

12886/9716

CSO: 1841/184

UDC 541.138

MECHANISM OF REACTIONS OF ELECTROCHEMICAL REDUCTION OF CARBON DIOXIDE GAS TO METHANE

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 291, No 6, Dec 86
(manuscript received 9 Jan 86) pp 1395-1399

[Article by V. A. Benderskiy and A.G. Krivenko, Department of the Institute of Chemical Physics, USSR Academy of Sciences, Chernogolovka, Moscow Oblast]

[Abstract] Reduction of CO_2 to CH_4 is an 8-electron process consisting of successive 2-electron stages forming formic acid, formaldehyde, methanol and methane. This article analyzes the mechanisms of single-electron reactions of the carbon cycle and estimates the energy losses resulting from formation of intermediate particles. A diagram of the free energies of successive single-electron reactions of the electrochemical carbon cycle is presented. The efficiency of the electrochemical carbon cycle within the framework of the single-electron reactions studied is quite low, making the search for catalytic electrochemical systems in which either 2-electron transition without intermediate formation of radicals, or, simultaneous attachment of a proton with formation of a CH-bond, an important area of study. Figures 2; references 12: 4 Russian, 8 Western.

6508/9716
CSO: 1841/159

UDC 547.15

PHOTOEFFECTS IN PIGMENT FILMS AS PRECURSOR PHENOMENA FOR PHOTOBATTERIES

Moscow ZHURNAL VSESOYUZNOGO KHIMICHESKOGO OBSHCHESTVA IMENI D.I. MENDELEYEVA in Russian Vol 31, No 6, Nov-Dec 86 pp 551-555

[Article by G.G. Komissarov and Yu.S. Shumov, Institute of Chemical Physics, USSR Academy of Sciences]

[Abstract] A review is presented of the variety of photoeffects obtained with pigment-containing films, beginning with the studies of Becquerel in 1839. The use of chlorophyll films expanded photo-biochemical research, and led to studies on other pigments and their derivatives. Studies with phthalocyanin

have provided indications that it may be feasible to design pigment-based photobatteries utilizing solar energy. A deeper understanding and control of the mechanisms responsible for photoelectrochemical generation of current shall provide a better understanding of photosynthesis itself, and open up a realistic expectation of solar photocatalytic systems. Figures 4; references 108: 72 Russian, 36 Western.

12172/9716
CSO: 1841/129

UDC 541.138:547.779'898'

ELECTROCHEMICAL BEHAVIOR OF METAL COMPLEXES OF DERIVATIVES OF DIBENZO[c,j]
DIPYRAZOLO[3,4-f:3',4'-m]-[1,2,5,8,9,12] HEXAAZACYCLOTETRADECINES ON
PYROGRAPHITE ELECTRODE

Riga KHIMIYA GETEROTSIKLICHESKIKH SOYEDINENIY in Russian No 9, Sep 86
(manuscript received 4 May 85; revised edition received 4 Oct 85) pp 1194-1199

[Article by S.B. Orlov, R.O. Kolninya and V.M. Dziomko, Institute of Electrochemistry imeni A.N. Frumkin, USSR Academy of Sciences, Moscow, All-Union Scientific Research Institute of Chemical Reagents and High-Purity Chemical Substances, Moscow]

[Abstract] The study, carried out by a cyclic voltamperometric method, showed that the electrochemical properties of the complexes of the series depended upon the presence and nature of side groups and upon the method of application of complexes containing $R^1, R^2 = NH_2$, on the electrode surface. These factors determined the possibility and conditions of transition of the complex into an electrochemically active state. Reversible redox-transitions observed on the potentiodynamic curve were attributed to oxidation and reduction of azogroups of the complexes while irreversible redox-processes were attributed to reduction of side groups of the complex, accompanied by attachment to the electrode surface and their oxidative destruction. Figures 3; references 8: 4 Russian, 4 Western.

2791/9716
CSO: 1841/105

CORROSION-ELECTROCHEMICAL PROPERTIES OF LOW-INDEX FACES OF HYDROGENATED NIOBIUM SINGLE CRYSTAL IN SULFURIC ACID ELECTROLYTE

Moscow ELEKTROKHIMIYA in Russian Vol 22, No 11, Nov 86 (manuscript received 7 Jan 85) pp 1481-1484

[Article by G.V. Khaldeyev and V.K. Gogel, Perm State University imeni A.M. Gorkiy]

[Abstract] Electrochemical characteristics of a low-index face of a niobium-sulfuric acid electrolyte system were assessed in a wide range of pH during small and large surges before and after hydrogenation. X-ray structural analysis of niobium single crystals before and after hydrogenation was performed on a DRON-2,0. Morphology of the surface of single crystals was studied by using an EM-7 electron microscope. Electrochemical measurements showed that hydrogenation of a niobium single crystal with low-index faces (110), (100) and (111) changed the cathodic behavior in the sulfuric acid electrolyte (pH 0.5-5.4) very little while anodic ionization was significantly passivated on the least tightly packed face of Nb (111). Coefficients of surface diffusion of hydrogen were determined by an electrochemical method. References 9: 6 Russian, 3 Western.

2791/9716
CSO: 1841/91

UDC 541.138.3:546

EFFECT OF OXIDE LAYERS ON PROCESS OF CATHODIC INTRODUCTION OF LITHIUM INTO ALUMINUM

Moscow ELEKTROKHIMIYA in Russian Vol 22, No 11, Nov 86 (manuscript received 16 Jan 85) pp 1497-1501

[Article by S.S. Popova, L.A. Alekseyeva, O.V. Belova, L.N. Petrova, I.G. Kiseleva and B.N. Kabanov, Saratov Polytechnic Institute; Institute of Electrochemistry imeni A.N. Frumkin, USSR Academy of Sciences, Moscow]

[Abstract] A study of the effect of an anodic oxide film on cathodic introduction of lithium into an aluminum electrode is described and discussed. The anodic film was produced by polarization of aluminum in concentrated aqueous solutions of different acids (perchloric, chromic, nitric, sulfuric and a mixture of citric and oxalic acids). The presence of an oxide on the aluminum surface could greatly impede or greatly accelerate cathodic introduction of lithium into the aluminum electrode, depending upon the conditions of its production, changing the kinetic law of the process. Current density of cathodic polarization upon introduction of lithium into oxidized aluminum and the corresponding delay of lithium dissolution on anodic chronopotentiograms decreased in the series of electrolytes oxidation: $\text{H}_2\text{C}_2\text{O}_4 + \text{C}_6\text{H}_8\text{O}_7 > \text{HNO}_3 > \text{H}_2\text{SO}_4 > \text{HClO}_4$

Aqueous Acid $\text{Al} > \text{H}_2\text{C}_2\text{O}_7$. Figures 5; references 14: 13 Russian, 1 Western.

2791/9716
CSO: 1841/91

HIGH-TEMPERATURE ELECTRODES FROM NICKEL PASTES

Minsk VESTSI AKADEMII NAUK BSSR: SERYYA KHIMICHNYKH NAUK in Russian
No 6, Nov-Dec 86 (manuscript received 17 Apr 86) pp 102-103

[Article by I.E. Chirkun, G.I. Novikov and N.M. Gamanovich, Belorussian Technologic Institute imeni S.M. Kirov]

[Abstract] A description is provided for preparation of high-temperature electrodes from nickel paste in rosin and turpentine, encompassing, in addition, bismuth oxide, lead borate, and a ceramic charge. The paste was applied to solid electrolytes ($\text{ZrO}_2\text{-Y}_2\text{O}_3\text{-CaO-MgO}$) and annealed at 1523 K under helium. The data on resistance and adhesiveness confirmed the utility of the approach for such high-temperature electrodes. References 6 (Russian).

12172/9716
CSO: 1841/150

SOLAR ENERGY

Moscow KHIMIYA I ZHIZN in Russian No 11, Nov 86 pp 8-10

[Article by M. Gurevich, special correspondent: "Sun, Water and a Little Money"]

[Abstract] Hydrogen is one of the most efficient and clean fuels than can be utilized by man, and is readily obtained by electrolysis of water. However, to further improve the efficiency of the entire process and render it a readily available resource, extensive studies have been conducted at Yerevan State University to harvest solar energy for electrolysis of water. Recent developments in anode technology have yielded a ceramic anode encompassing titanium oxide that raised the efficiency of electrolysis to better than 1.5%, a marked improvement over the $10^{-3}\%$ figure seen a few years ago. Current studies involve the further development of better anodes and cathodes, as well as concentrators of solar energy that increase the intensity of light 400-fold. Such experimental systems are expected to produce 0.5 liters of hydrogen per hour. By the end of the present Five-Year Plan the Yerevan scientists are expected to increase the efficiency of the process to around 3%, and to create a system yielding 25 liters of hydrogen per hour per one square meter of electrode surface.

12172/9716
CSO: 1841/164

KINETICS AND MECHANISM OF ELECTROCHEMICAL FORMATION OF SURFACE POROUS LAYER ON SILICON IN HYDROFLUORIC ACID. KINETICS OF FORMATION OF POROUS LAYER ON ELECTRON AND WHOLE SILICON

Moscow ELEKTROKHIMIYA in Russian Vol 22, No 12, Dec 86 (manuscript received 5 Feb 85) pp 1597-1603

[Article by S. O. Izidinov, A.P. Blokhina and T. S. Martynova, All-Union Electrotechnical Institute imeni V. I. Lenin, Moscow]

[Abstract] A discussion is presented of the results of a comparative study of the growth kinetics of the porous layer on n-type and p-type silicon in 48% HF considering data on the kinetics of dissolution under the formation conditions and the photoelectrochemical behavior of n-type silicon in various stages of porous layer formation. The growth curve on n-type silicon has two sectors with a transition area between them: A sector of linear formation kinetics, and a sector in which thickness remains practically constant. On p-type, the linear kinetics continue throughout the entire growth interval. The growth rate on n-type during the linear period is 3.5-4 m/min, on p-type 0.5-0.6 m/min. The rate of dissolution of silicon is constant on both types. The data presented allow close correlation of the shape of the polarization curves and chronopotentiograms with the formation kinetics and properties of the porous layer on n-type silicon. The type of conductivity and degree of doping strongly influence the properties of the porous layer. The diameter of pores on n-type silicon is 1-3 m, the number about 10^6 cm^{-2} for typical current densities. When a critical pore length is reached, mass transfer within pores forms the limitation which passivates the active zone at the bottom of the pores due to formation of an oxide film, causing a drop in growth rate of the porous layer. Figures 4; references 19: 10 Russian, 9 Western.

6508/9716
CSO: 1841/133

UDC 538.56:519.25

FLUCTUATION-DISSIPATION MODELS OF NONEQUILIBRIUM ELECTROCHEMICAL NOISE

Moscow ELEKTROKHIMIYA in Russian Vol 22, No 12, Dec 86 (manuscript received 18 Mar 85) pp 1631-1636

[Article by G. N. Bochkov and A. L. Orlov, Gorkiy State University]

[Abstract] A statistical-thermodynamic method of studying nonequilibrium fluctuations in nonlinear systems, based on generalized strict fluctuation-dissipation equations and certain hypotheses on the statistics of the transfer process, is used to analyze electrochemical noise. The use of the fluctuation-dissipation equations and the Poisson statistical model of charge transfer relates the spectral density of nonequilibrium voltage fluctuations with the polarizing current and mean voltage. An electrochemical

cell was studied to which a constant voltage was applied, producing a current corresponding to the steady nonequilibrium state of the system. The results agree with the results of measurement of both equilibrium and nonequilibrium electrochemical noise. Figure 1; references 14: 9 Russian, 5 Western.

6508/9716
CSO: 1841/133

UDC 541.138.3

CATHODIC LIBERATION OF HYDROGEN ON INDIVIDUAL FACES OF COBALT SILICIDE SINGLE CRYSTAL IN SULFURIC ACID ELECTROLYTE

Moscow ELEKTROKHIMIYA in Russian Vol 22, No 12, Dec 86 (manuscript received 13 Aug 85) pp 1670-1673

[Article by A. B. Shein and V. I. Kichigin, Perm State University imeni A.M. Gorkiy]

[Abstract] Silicides of the transition 3d metals include compounds with high conductivity, semiconductors and semimetals, and super conductors. This article presents results of a study of the process of cathodic liberation of hydrogen on individual faces of a cobalt silicide single crystal in a sulfuric acid electrolyte. The specimens studied were manufactured from cobalt monocosilicide CoSi, pressed in teflon holders leaving one face uncovered. The mechanism of the hydrogen liberation reaction in CoSi is found to be similar to the mechanism characteristic for Co. The varying crystallographic orientation of faces of the CoSi single crystal has the major influence on the kinetic characteristics of the hydrogen liberation reaction, though not on its mechanism. Figures 2; references 10: 7 Russian, 3 Western.

6508/9716
CSO: 1841/133

UDC 541.138.3

POROUS CATHODE IN NONAQUEOUS SOURCES OF CURRENT WITH DISSOLVED ACTIVE CATHODIC SUBSTANCE. ELECTROCHEMICAL SURFACE ACTIVATION

Moscow ELEKTROKHIMIYA in Russian Vol 22, No 12, Dec 86 (manuscript received 2 Dec 85) pp 1684-1687

[Article by Ye. M. Shembel, O. S. Ksenzhek, N. P. Danilova and V.A. Shustov, Dnepropetrovsk Institute of Chemical Engineering imeni F. E. Dzerzhinskiy]

[Abstract] Results are presented from a study of electrochemical activation of porous carbon graphite electrodes used as cathodes in an Li-SO₂ system. Experiments were performed in dry argon with water content limited to some hundredths of 1% using porous electrodes in a glass cassette as the cathodes, lithium--comparison-electrode and supplementary-electrodes pressed into glass tubes. Electrochemical activation of the cathodes was based on the

process of anodic oxidation of the nonaqueous electrolyte, forming gas products with electrochemical activity. It was found that preliminary anodic polarization of the porous electrode significantly improves the effectiveness of cathodic reduction of SO_2 . The degree of activation of the surface varied with the macrostructure of the initial porous electrode and activation conditions. Electrochemical anodic activation of porous electrodes allows an increase in the power of current sources. Figures 4; references 5: 4 Russian, 1 Western.

6508/9716
CSO: 1841/133

UDC 541.138.2:541.14

ANODIC PHOTOCURRENT IN METAL-DIELECTRIC-CHLOROPHYL SYSTEM

Moscow ELEKTROKHIMIYA in Russian Vol 22, No 12, Dec 86 (manuscript received 2 Dec 85) pp 1690-1692

[Article by L.A. Khanova, Institute of Electrochemistry imeni A. N. Frumkin, USSR Academy of Sciences, Moscow]

[Abstract] Continuing earlier studies of the photocurrents in chlorophyll monolayers adsorbed onto metal, the author reduces the interaction of the metal and the pigment by introducing an intermediate dielectric monolayer of cetyl alcohol and discusses the anodic photocurrent obtained in an amalame of gold/cetyl alcohol/chlorophyll. Steady photocurrents are found, indicating that a continuous flow of electrons passes from the metal through the pigment to the acceptor or from the donor through the pigment to the metal. Since excited chlorophyll may act as either donor or acceptor, the processes can follow two different paths. At present, it is difficult to select between these two reaction paths. Figures 2; references 6: 3 Russian, 3 Western.

6508/9716
CSO: 1841/133

UDC 541.13:621.315.592

SPECTRAL PHOTSENSITIVITY OF GaAs ELECTRODE

Moscow ELEKTROKHIMIYA in Russian Vol 22, No 12, Dec 86 (manuscript received 23 May 85) pp 1693-1695

[Article by G. Ya. Kolbasov and N. I. Taranenko, Institute of General and Inorganic Chemistry, UkSSR Academy of Sciences, Kiev]

[Abstract] A study was made of the photosensitivity of a GaAs electrode in the 280-880 nm wavelength range, limited at the shortwave and by absorption of the electrolyte, at the longwave end by the width of the forbidden zone in the semiconductor. Single crystal films of GaAs were studied, applied by liquid epitaxy to low-resistance GaAs substrates with (100) surface orientation. The results of measurement of spectral dependence of

photocurrent show that the spectral photosensitivity of the GaAs electrode is largely determined by the status of the phase interface and the electrode potential. The results indicate that the photosensitivity of the semiconductor-electrolyte system depends essentially on the transfer conditions in the electrolyte of the major charge carriers and recombination losses at the phase boundary, increasing with an increase in bend of the energy zones on the surface of the GaAs and decreasing electrolyte pH. Figures 3; references 9: 5 Russian, 4 Western.

6508/9716
CSO: 1841/133

UDC 577.3

TRANSFORMATION OF SOLAR ENERGY IN PHOTOSYNTHESIS: PROBLEMS AND PROSPECTS

Moscow ZHURNAL VSESOYUZNOGO KHIMICHESKOGO OBSHCHESTVA IMENI D.I. MENDELEYEVA in Russian Vol 31, No 6, Nov-Dec 86 pp 482-488

[Article by A.A. Krasnovskiy, academician, Photobiochemistry Laboratory, Institute of Biochemistry imeni A.N. Bakh, USSR Academy of Sciences]

[Abstract] The increasing use of biomass as an energy source can eventually be expected to diminish in the underdeveloped countries as a result of development of alternative energy sources, and to increase in the developed countries to provide 5-10% of the total energy demand. The combustion of organic products of photosynthesis leads to increasing concentrations of CO₂ in the atmosphere. The resultant heating effect, i.e., the so-called greenhouse effect, may have unforeseen ecologic sequelae. However, the increase in atmospheric CO₂ may intensify global photosynthesis. Current research efforts in photosynthesis are directed at optimization of the process for practical applications. Through a combination of biochemical and genetic engineering the anticipation is to create systems that may utilize solar energy in a more efficient manner. Continuous photosynthetic processes are anticipated with an efficiency of ca. 30%, as well as the development of photobiotechnical systems that can be directed at the synthesis of desired biomolecules and for other processes, such as photolysis of water into H₂ and O₂. Figures 5; references 23: 16 Russian, 7 Western.

12172/9716
CSO: 1841/129

UDC 621.928.8:628.3

PROPERTIES OF AUXILIARY MAGNETIC SUBSTANCE USED TO REMOVE PHOSPHATES FROM WATER

Kiev KHIMIYA I TEKHOLOGIYA VODY in Russian Vol 8, No 6, Sep-Oct 86
(manuscript received 17 Sep 84) pp 88-89

[Article by V.M. Borovskiy, G.S. Nikol'skiy, I.P. Spevakova, I.A. Vaynshteyn and L.D. Klenysheva, UkrkommunNIIProyekt; VNIPIChermetenergoochistka, Kharkov]

[Abstract] Prospects of use of a magnetite-gypsum mixture (1:1), obtained from used pickling solutions of metallurgy production, as an auxiliary magnetic substance in water purification are described and discussed. The product may be produced as a magnetite-gypsum composition or in pure form. Properties of a magnetite-gypsum composition (MGK) a magnetic powder--with traces of gypsum obtained from MGK by washing it in water (M)--and a magnetite powder obtained by ammoniacal neutralization of pickling solutions (AM)--were studied in order to determine their value as solvents and to assess the possibility of separation of aqueous suspensions of them in magnetic fields with low intensity gradient. Adsorption properties of MGK, M and AM were studied in relation to phosphates dissolved in domestic effluents and in soft model water containing no organic pollutants. Adsorption capacity of MGK powder containing Ca^{2+} in the grain was higher than that of pure magnetite. MGK and M powders had lower adsorption capacity while AM powder had higher adsorption capacity in sewage than in the model water. Treatment by a 10 percent solution of NaOH always increased adsorption capacity of MGK and M powders. Adsorption capacity of AM powder increased in sewage but decreased in the model water. Extraction of phosphate ions was effective only when their bond with the magnetite particles was realized via cations of bivalent metals. The presence of calcium in MGK and M powders increased the effectiveness of this mechanism in both the model water and the effluents. For AM, intensification of phosphate-ions adsorption occurred only in hard waste water. Treatment by alkali produced a negative surface charge which ensured an electrostatic bond of the magnetic particles and the metal cations.

2791/9716

CSO: 1841/94

INTENSIFICATION OF BIOLOGICAL PURIFICATION OF EFFLUENTS FROM CHEMICAL ENTERPRISES WITH AID OF MUTAGENESIS

Kiev *KHIMIYA I TEKHOLOGIYA VODY* in Russian Vol 8, No 5, Sep-Oct 86 (manuscript received 2 Jul 84) pp 92-93

[Article by V.V. Naydenko, I.A. Rapoport, V.I. Zamelin, Yu.F. Kolesov and S.V. Vasilyeva, Gorki Engineering Construction Institute imeni V.F. Chkalov; Institute of Chemical Physics, USSR Academy of Sciences, Moscow]

[Abstract] Prospects of increasing the effectiveness of removal of phenols and methylmethacrylate during purification of chemical plant effluents by treating the active silt with a chemical mutagen (NEM), are discussed. Experiments performed in an aeration tank containing NEM and in one without it (control) showed that the degree of reduction of concentration of phenols in the tank containing active silt treated by NEM was 12-15 percent higher than that in the control tank. Similar experiments performed on actual chemical industry effluents reconfirmed the greater purification efficiency of NEM-treated active silt. It was shown that treatment of the same quantity of active silt by the mutagens increases its oxidative capacity in a shorter period of time and ensures more complete purification of effluents. Figure 1; references: 2 Russian.

2791/9716

CSO: 1841/94

TRACE ELEMENTS FOR SOIL ENRICHMENT

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 20 Nov 86 p 4

[Article by A. Zabotin: "From the Workshop to the Fields"]

[Text] At the Scientific Research Institute of Chemistry of Gorky University I was shown some small blue, green and yellow packets. They were presented to me with great pride as the key, in packages, of soil fertility through copper, copper-ammonium and manganese fertilizers.

Plants do not require a lot of trace elements but, when the soil does not get them year after year, a deficiency often reflects negatively on the harvest. It is not possible to replenish trace elements with inorganic and organic fertilizers. There are not enough metal salts which can be used as fertilizers.

Gorky's scientists have developed a basically new fertilizer--a polymer electrolyte. It does not dissolve in water, which means it does not pollute the river. However, it readily returns trace elements to the soil. Practically any metal necessary for plant growth can be attached to its polymer base.

Candidate of Chemical Sciences Ye. Krylov told us that they, together with the Department of Biochemistry and Plant Physiology of the University, have conducted a series of experiments; first on a small field, and later on a bigger scale at one of the state farms [sovkhozes].

The increase in the crop reached almost 50%. The plants received the necessary microelements from the new fertilizer by the process of the ion-exchange of hydrogen. In this process, a polymethacrylic acid forms which significantly improves the structure of the soil. Once these fertilizers are introduced into soil, their action lasts up to 5 years, so that the farmers do not have to worry about supplementing the soil with the microelements for that period.

A major still unsolved problem was setting up commercial release of the new fertilizer. "What raw material was to be used?" - asked Ye. Krylov.

He and the co-workers did not have to look too long for it. One can find expended acid containing zinc in any print shop. Zinc is needed by the plants. At the moment, there is a special arrangement made to process a zinc-containing acid from the print shop of "Gorky Pravda" press. The polymer base takes up zinc and the remaining "purified" acid returns to the printing shop, while the fertilizer goes to the fields.

A similar process, of utilizing copper from the waste, has been set up at one of the Gorky enterprises. Gorky's method allows utilization of waste from a variety of the branches of industry. For example the polymer base can be made from lignin, a by-product of the cellulose industry.

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CSO: 1841/47

UDC 548.732+620.187.3

HIGH RESOLUTION ELECTRON MICROSCOPY AND X-RAY DIFFRACTION OF EPITAXIALLY GROWN SILICON ON SAPPHIRE

Moscow POVERKHNOST in Russian No 1, Jan 87 (manuscript received 31 Jan 1986)
pp 123-132

[Article by A. L. Vasilyev, A. L. Golovin, K. M. Manafov, R. M. Imamov and N. A. Kiselev, Institute of Crystallography, USSR Academy of Sciences, Moscow]

[Abstract] High resolution transmitting electron microscopy and new X-ray diffraction methods were used to study the actual structure of samples of epitaxial layers of silicon on sapphire. Structural defects in the epitaxial silicon layers, the boundaries of separation, and the crystalline lattice of silicon and sapphire were observed directly with high resolution electron microscopy. Two samples of the silicon on a sapphire heterosystem were studied with silicon layer thickness of 0.5-0.6 μm and specific resistance of 5-60 ohm/cm layers. Samples with a different growth technology show that different parameters of the layer and substrate lead to twins of different types and stacking faults. The data of the combined methods indicate an increase of density of the twins as the interface is approached. Two types of microtwins and packing defects are shown by the microscopy method. The microtwin concentration is greater for the interface and less for the surface of the layer. The ratio of twin concentration in the two samples for the interface is 4:1 and for the nearby surface is 9:1. The twin concentration in the two samples depends on the growth technology. Using a power source of 30 kW, the diffraction signal was registered directly for twin type $\{113\}$ for the sample of higher twin concentration. For the sample with the smaller concentration of twins, the signal was not obtained. To detect smaller concentrations of twins, a greater power source is needed. The difference in the microtwin concentrations in the two samples is associated with the accuracy of orientation of the substrate. For the two samples, deviations were 0.8° and 0.3°. The difference was caused to a degree by the amount of atomic height at the interface in the two samples. By X-ray diffraction, the silicon density in the silicon-sapphire system is less than the density of the ideal silicon monocrystal by 30±10% for one sample and by 7±2% for the other, which can be associated with a higher concentration of defects in the former sample. By combining X-ray methods with high resolution electron microscopy, a complex investigation of the silicon-sapphire

heterosystem was made and the relationship between structural changes and layer deposition technology was revealed. Figures 7; references 13: 2 Russian, 11 Western.

12886/9716
CSO: 1841/183

FIFTH SEMINAR ON PHYSICAL CHEMISTRY OF SURFACES OF MONOCRYSTALLINE SEMICONDUCTORS

Moscow POVERKHNOST in Russian No 1, Jan 87 pp 147-149

[Article by M. R. Bakalanov]

[Abstract] The seminar was held on October 2 to 4, 1985 in Vladivostok. It was organized by the Institute of Physics of Semiconductors, Siberian Department of the USSR Academy of Sciences and the Institute of Automation and Control Processes, Far East Science Center, USSR Academy of Sciences. Actual problems of the physical chemistry of the surface of semiconductors, associated with recent theoretical and experimental studies, were considered. These were discussed: 1) Chemosorption. Electron spectroscopy and formation of surface phases. Bond of electron and atomic structures of the surface. 2) Adsorptive stages and vapor reactions in the growth process of dielectric layers. Thermodynamic modeling at the interface of solid phases. 3) Mechanisms of chemical reactions during plasma-chemical etching of semiconductors. 4) Surface structure and reaction for the semiconducting compounds $A^{III}B^V$. 5) Problems of biomolecular electronics. Discussion on the thermodynamic aspects of dimetric surface phases attracted particular attention of the seminar participants. The seminar noted great progress since seminar IV.

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CSO: 1841/183

UDC 621.315.592

EFFECTS OF Ga DOPING ON PHOTOCONDUCTIVITY SPECTRA OF GaAs SINGLE CRYSTALS

Ashkhabad IZVESTIYA AKADEMII NAUK TURKMENSKOY SSR: SERIYA FIZIKO-TEKHNIЧЕСКИХ, ХИМИЧЕСКИХ I GEOLOGИЧЕСКИХ НАУК in Russian No 5, Sep-Oct 86 (manuscript received 6 Mar 85) pp 96-97

[Article by Ya. A. Agayev, G. Garyagdyev, V. V. Gordiyenko, V.V. Dyakin, Kh. Rakhimov and N. S. Khilimova, Turkmen Polytechnic Institute]

[Abstract] An analysis was conducted on the effects of doping the surface of GaAs by Ga using vapor deposition under vacuum, and the effects of subsequent removal of the Ga film by silk polishing, on the respective photoconductivity spectra. Comparison of the spectra and maxima demonstrated diminution in sensitivity at 0.6-2 μm . The decrease in photosensitivity was apparently due to recombination of electron-hole pairs into inactive

centers containing a large number of Ga atoms and rapid nonradiant dissipation of photoexcitation energy. Changes in the maxima were due to the rate of surface electron-hole recombinations. Figures 2; references 3 (Russian).

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CSO: 1841/154

UDC 543.51:[546.631-31+546.832-31]

MASS SPECTROMETRIC STUDIES ON VAPORIZATION OF SOLID $\text{HfO}_2\text{-Sc}_2\text{O}_3$ SOLUTIONS

Kiev UKRAINSKIY KHIMICHESKIY ZHURNAL in Russian Vol 52, No 11, Nov 86
(manuscript received 17 May 85) pp 1123-1125

[Article by G.A. Semenov, L.A. Kuligina, G.A. Teterin, Ye.M. Menchuk and T.M. Shkolnikova, Scientific Technology Complex, Physicochemical Institute, Ukrainian SSR Academy of Sciences, Odessa; Scientific Research Institute of Chemistry of Leningrad University]

[Abstract] High temperature mass spectrometry was employed in a study on the components of solid $\text{HfO}_2\text{-Sc}_2\text{O}_3$ systems, consisting of 10, 20 or 50 mole% Sc_2O_3 . The pressure-composition plots at 2600 K revealed a positive deviation from linearity for the pressure of ScO vs. Sc_2O_3 content plots, without a deviation in the case of HfO . In view of the pronounced differences in volatility of the components, the solid solution tends toward pure hafnium oxide. This was further borne out by calculations of the energies of association (W_2) which provided values of $W_{2\text{HfO}_2} = 1534$ kJ/mole and $W_{2\text{Sc}_2\text{O}_3} = 714$ kJ/mole. Figures 2; references 10: 7 Russian, 3 Western.

12172/9716
CSO: 1840/158

UDC 537.311+541.133:546.683.1'571'221

CONDUCTIVITY MECHANISMS IN $\text{Tl}_2\text{S-Ag}_2\text{S}$ MELTS

Kiev UKRAINSKIY KHIMICHESKIY ZHURNAL in Russian Vol 52, No 11, Nov 86
(manuscript received 7 May 85) pp 1133-1135

[Article by I.A. Ilchenko and V.F. Zinchenko, Kiev Automobile and Road Institute]

[Abstract] Electrical conductivity and ion-transfer studies were conducted on $\text{Tl}_2\text{S-Ag}_2\text{S}$ melts over a temperature range beginning at the crystallization point to 873 K, with silver sulfide component varied to 83 mole%. The electrical conductivity of Tl_2S was found to diminish as the concentration of Ag_2S increased. As the concentration of Ag_2S increased the temperature-conductivity plots lost their exponential feature and became more rectilinear, especially at the lower temperatures. The change in the sign of the slope was apparently due to chemical reaction of the sulfides and

the resultant loss of electron mobility. The data led to construction of diagrams depicting conductivity as it relates to the ionic fraction of the melt, indicating that such an approach may be used in the formulation of resistant materials. Figures 3; references 6 (Russian).

12172/9716

CSO: 1841/158

BRONZING PLASTICS

Moscow KHIMIYA I ZHIZN in Russian No 11, Nov 86 p 83

[Article by A.V. Koryukin]

[Abstract] Many plastic articles may be treated with a special lacquer that contains dispersed metal particles to impart to the object the appearance of old bronze. One of the best enamels for this purpose is the acrylic resin-based AS-588. After pretreatment with the enamel to render the surface electroconductive, the object is immersed in a special solution (200 g copper sulfate and 50 g sulfuric acid in 1 liter of water), and then subjected to a 0.4 A/dm^2 current for several minutes for electroplating. The surface may then be aged by treatment with potassium persulfate or a mixture prepared from sulfur and sodium hydroxide.

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CSO: 1841/164

UDC 546.1.546.16

GOLD HEPTAFLUORIDE

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 291, No 1, Nov 86
(manuscript received 17 Feb 86) pp 125-128

[Article by A.A. Timakov, V.N. Prusakov and Yu.V. Drobyshevskiy, Atomic Energy Institute imeni I.V. Kurchatov, Moscow]

[Abstract] Interaction of gold pentafluoride and atomic fluorine are studied in order to investigate the possibility of existence and production of higher gold fluorides. Reactions involved in production of gold heptafluoride were presented and discussed. Study and identification of the compound were greatly impeded by its high reaction capacity, great corrosion activity and rapid hydrolysis by moisture. Infra-red spectroscopic study of the compound is described and discussed. References 8: 6 Russian, 2 Western.

2791/9716

CSO: 1841/111

THERMODYNAMIC PROPERTIES OF CRYSTALLINE BORATES OF CESIUM AND RUBIDIUM

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 291, No 1, Nov 86
(manuscript received 6 Jan 86) pp 166-168

[Article by M.M. Shults, N.M. Vedishcheva and B.A. Shakhmatkin, Institute of Chemistry of Silicates imeni I.V. Grebenshchikov, USSR Academy of Sciences, Leningrad]

[Abstract] Enthalpies of formation of crystalline compounds found in $\text{Rb}_2\text{O}-\text{B}_2\text{O}_3$ and $\text{Cs}_2\text{O}-\text{B}_2\text{O}_3$ systems were studied calorimetrically. Results of this study and existing data were used to compare thermodynamic properties of the alkaline borates in crystalline and vitreous states. Formation of crystalline borates of rubidium and cesium proceeded with significant exothermal effect due to acid-base interaction of the components. Comparison of enthalpies of formation of the crystals studied and apposite glasses confirmed the inequilibrium of structure of the glasses. It was found that heats of crystallization of rubidium-borate and cesium-borate glasses approximately equal enthalpies of crystallization of the boric anhydride contained in them. Figure 1; references 7: 5 Russian, 2 Western.

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CSO: 1841/111

UDC 548

DEFORMATION ELECTRON DENSITY IN COMPOUND YNi_2Ge_2 CRYSTAL

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 291, No 6, Dec 86
(manuscript received 18 Jul 85) pp 1362-1365

[Article by V.K. Belskiy, O.I. Bodak, Ye.I. Gladshevskiy, V. Ye. Zavodnik and V. K. Pecharskiy, Lvov State University imeni I. V. Franko; Scientific Research Physical-Chemical Institute imeni L. Ya. Karpov, Moscow]

[Abstract] A study was made of the distribution of deformation electron density in a crystal of the ternary intermetallic compound YNi_2Ge_2 which crystallizes with a structure similar to GeAl_2Ga_2 . Projection of the unit cell of the structure of the compound and coordination polyhedrons of the atoms are presented. Direct proof was produced of the formation of covalently-bonded pairs of Ge_2 in the compound. The absence of maxima in the deformation electron density on the bond lines of the remaining atoms indicates that chemical bonding between them is by means of partially delocalized electrons. The concentration of deformation electron density in the interatomic space so that the maxima are located among several atoms indicates that the metallic bond in the crystal is produced by incompletely delocalized valent electrons. There is strong heterogeneity in the distribution of the deformation electron density. None of the atoms in the compound have spherical symmetry. The decrease in the distance between individual atoms in the structure is a necessary but not sufficient condition for development of a covalent bond. Figures 2; references 8: 7 Russian, 1 Western.

6508/9716
CSO: 1841/159

UDC 547.979.733:621.315.592:543.422.6

OPTICAL AND ELECTROPHYSICAL PROPERTIES OF TETRA(1,4-DITHIACYCLOHEXENE)
PORPHYRAZINE METAL COMPLEXES

Riga KHIMIYA GETEROTSIKLICHESKIKH SOYEDINENIY in Russian No 9, Sep 86
(manuscript received 23 Apr 85) pp 1276-1279

[Article by G.P. Shaposhnikov, V.P. Kulinich, Yu.M. Osipov and R.P. Smirnov,
Ivanovo Chemical Engineering Institute, Ivanovo]

[Abstract] Optical and electrochemical characteristics of metal complexes of tetra-(1,4-dithiacyclohexene) porphyrizine were measured. The presence in molecules of the studied compounds of 1,4-dithiacyclohexene rings led to the appearance in the spectra, of absorption bands characteristic of a $p \rightarrow \pi^*$ transition. The position of the long-wave bands responsible for the $\pi \rightarrow \pi^*$ transition was determined by the nature of the metal. All of the complexes possess semiconducting properties: the specific electrical conductivity lies within limits of 10^{-11} - $10^{-9} \text{ Ohm}^{-1} \cdot \text{cm}^{-1}$. Figures 2; references 8: 7 Russian, 1 Western.

2791/9716
CSO: 1841/105

UDC 621.793.1.547.1 13

STRUCTURE OF COATINGS PRODUCED BY VAPOR DEPOSITION OF ORGANO-CHROMIUM
COMPOUNDS

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 291, No 1, Nov 86 (manuscript received 28 Jan 86) pp 129-132

[Article by A.F. Shurov, A.M. Kotkis, G.A. Domrachev, B.S. Kaverin, V.A. Kostenkov, A.I. Yerebin and N.I. Levchenko, Institute of Chemistry, USSR Academy of Sciences, Gorkiy]

[Abstract] Direct electron-microscopy and microdispersion were used to study the structure of coatings produced by thermal decomposition of chromoorganic compounds in the 400-500°C range. The coatings produced contain polycrystalline chromium carbide in a structurally non-equilibrium state. The

non-equilibrium was caused by the presence in the coatings of micropores combined with apposite grain sizes (10 and 80 nm). Recrystallization of these ultradispersed systems may begin at temperatures much lower than the recrystallization temperature in an equilibrium system due to the high energy of the boundaries of the grains. The non-equilibrium state was stabilized by admixtures of organic molecules which are located in pores with average size of 5 and 18 nm in the form of monomolecular and poly-molecular adsorption and by capillary effects. The possibility of producing chromium carbide in an ultradispersed state at 400°C in 1-500 Å coatings is important from the practical point of view. Figures 3; references 7 (Russian).

2791/9716

CSO: 1841/111

UDC 547.514.71

PROSTANOIDS. PART 18: SYNTHONES FOR CARBACYCLINE

Leningrad ZHURNAL ORGANICHESKOY KHIMII in Russian Vol 22, No 10, Oct 86
(manuscript received 5 Jul 85) pp 2100-2108

[Article by Ye.T. Lesnikova, M.S. Miftakhov and G.A. Tolstikov, Institute of Chemistry, Bashkin Branch, USSR Academy of Sciences, Ufa]

[Abstract] Some approaches to intermediates of bicyclic structure, which may be used in carbacycline synthesis, were developed by proceeding from 7,7-dichloro-4-exo-trimethylsilylbicyclo [3.2.0] hept-2-ene-6-one [pictured as structure III]. Ketone (III) was obtained as a basic product during interaction of dichloroethane and 5-trimethylsilylcyclopentadiene. Some reactions of this compound with electrophils were studied in order to create a ω -chain. Interaction of 4-exo-trimethylbicyclo-[3.3.0]octo-2-ene-7-one with bromine gave 4-beta-bromobicyclo-[3.3.0]octo-2-ene-7-one, which enters smoothly into catalyzed $\text{PdCl}_2 \cdot (\text{MeCN})_2$ by a cross-coupling reaction with E-1-tributylstannyl-3-hydroxy-1-octene, leading to 2 beta-(3-hydroxy-trans-1-octenyl)bicyclo [3.3.0]octo-3-ene-7-one, an important carbacycline synthone. References 18: 3 Russian, 15 Western.

2791/9716

CSO: 1841/116

UDC 547.551.54+781.1+792.1+822.3+898.057

NOVEL DERIVATIVES OF 2,4- AND 2,6-DINITROANILINES

Kiev UKRAINSKIY KHIMICHESKIY ZHURNAL in Russian Vol 52, No 11, Nov 86
(manuscript received 21 May 85) pp 1215-1217

[Article by E.I. Ivanov and G.V. Fedorova, Physicochemical Institute, Ukrainian SSR Academy of Sciences, Odessa]

[Abstract] The importance of 2,4- and 2,6-dinitroanilines as pesticides led to the synthesis of a series of derivatives in an attempt to expand the scope of useful agents. The basic approach consisted of the addition of a number of heterocyclic rings, including diaza-18-crown-6 and monoaza-15-crown-5

ethers. In the general approach, 2-chloro-3,5-dinitrobenzophenone or the methyl ester of 4-chloro-3,5-dinitro-benzoic acid in benzene or DMFA were reacted with an equimolar concentration of an azole or a crown ether with triethylamine as the catalyst, and heated for 2 to 7 h. In the case of reactions in DMFA, the reactants were poured into ice water and the precipitate recovered, while benzene was eliminated by distillation in vacuo, with the precipitate washed with water and recrystallized. Structural formulas are presented on the products, as well as IR and UV data and some physical properties. References 4 (Russian).

12172/9716

CSO: 1841/158

UDC 577.355.3;581.132

PHOTOSYNTHESIS AND HERBICIDES

Moscow ZHURNAL VSESOYUZNOGO KHIMICHESKOGO OBSHCHESTVA IMENI D.I. MENDELEYEVA
in Russian Vol 31, No 6, Nov-Dec 86 pp 567-576

[Article by M.G. Goldfeld and N.V. Karapetyan, Institute of Biochemistry
imeni A.N. Bakh, USSR Academy of Sciences]

[Abstract] A review is presented of the mechanisms of action of herbicides that act on the photosynthetic apparatus of plants. The vast majority of such agents exert their action on the membrane-related light reactions, with relatively few affecting the dark reactions. Among the primary effects of the antiphotosynthetic herbicides--that are apparent within seconds of minutes of exposure--is the formation of reactive free radicals, photooxidative reactions with oxygen, inhibition of electron transport, inhibition of photo-phosphorylation, and depression of the levels of ATP, reduced NADP, and of ferredoxin. The secondary effects become evident within 10 min, and follow from the depletion of ATP, NADPH₂ and ferredoxin stores, consisting of degradation of the pigments, primarily the carotenoids. Over the next 2-4 h membrane and cellular disintegration takes place. Figures 6; references 137: 13 Russian, 124 Western.

12172/9716

CSO: 1841/129

PETROLEUM, COAL PROCESSING

OIL RECOVERY INTERSECTOR COMPLEX

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 21 Dec 86 pp 1-2

[Article by Ye. Leontyeva, deputy editor of the science and technical progress department of the newspaper: "What Is To Be Left Behind the Threshold"; first paragraph is SOTSIALISTICHESKAYA INDUSTRIYA introduction]

[Text] The intersector scientific-technical complex Nefteotdacha was established in one of the most complex directions of the development of industry: in recent years oil industry workers have been considerably in debt to the government. The Oil and Gas Scientific Research Institute became the head organization of the complex--namely, it, by rallying scientific forces, must give the sector a "second wind". In the shortest possible time, it is necessary to work out new methods for raising the output of strata, thoroughly to improve oil recovery technology, and to give the most advanced engineering to the oil-bearing regions. But, in order to resolve these tasks successfully, it is necessary first to change many things in the work of the head institute and in the psychology of its workers.

Whoever has visited the outskirts of Baku surely has left in his memory a forest of borehole derricks. Poets have sung about and prose writers have extolled this forest. Only it is becoming clear that there is no special necessity to grow such a forest. It is sufficient to put single derricks further apart from each other. While the oil would not be obtained in a lesser quantity, the cost would be cheaper than "from a forest".

It should be specified that it has not been determined just recently--the controversy of petroleum scientists has been going on for a long time: what must be the spacing of the wells? Close together or far apart? Mistakes in this matter have been (and are still) very costly. Indeed, the price of one well currently is just under a million [rubles].

Many people now would like to forget about this document. But it exists and says a lot. And it concerns precisely the basic problem of spacing.

"If you accept the viewpoint of Academician Krylov, great harm will be inflicted on the national economy by this. He stands on mechanistic positions and ignores dialectic materialism..."

This is from the decisions of the colleagues of the Ministry of the Petroleum Industry published in 1980.

Why get you into this jungle? Why bring up old documents? We stand on the threshold of new grandiose work--but we won't go into that now. Thus, or approximately thus, they spoke to me apropos of this document in the Ministry of the Petroleum and Gas Industry. Why bring it up? Precisely in order to have a clear statement which must cross the threshold of the complex--this according to the plan of the revolutionary organization, which it is not.

Historical forgetfulness is an unpardonable thing. And already there is all the more reason not to forget yesterdays, and what has still not recuperated and has not succeeded in becoming history. The Soviet school of oil deposit development is unthinkable without the name of Aleksandr Petrovich Krylov and without his scientific contribution to it. For many long years he headed the Oil and Gas Scientific Research institute. Because of him, the Soviet Union became a pioneer in a flooding method by means of which we obtain today 90 percent of the total volume of oil recovered in the USSR. Namely, this method also enabled wells to be thinned out: water injected into a stratum helps to displace oil from a wider "field".

Far from all scientists supported him. It is better to say--not many. The contrary viewpoint was the official policy of the ministry. Is there any doubt: concentration of wells, which was not overlooked either, was convenient for producers--the easier "to remove foams" from the deposits. That is the reason the document cited above appeared, published in the ministry and signed by many scientists. Its purpose is clear: by waving the administrative baton, to conceal "the disturbing matter of controversy". And at the same time--to discredit Krylov, and his scientific approach to the enterprise. At that time Aleksandr Petrovich had already given up his post as director.

The former deputy minister E. Khalimov signed the document first. G. Vakhitov, director of the Oil and Gas Scientific Research Institute, who shifted to Krylov, also signed it. The "Khalimov-Vakhitov" symbiosis took shape at once and appeared firm. The former did not tolerate other people's opinions, and the latter was always ready to do a good turn and to do everything "according to the ministry way". And if Krylov never waived in the interests of science for the sake of "needs of the day", his successor Vakhitov preferred not to be hindered by this principle.

During the time of his directorship, the institute succeeded in becoming petty. Much of what was accumulated by the Krylov school was scattered to the wind. That is the reason why, when the problem arose as to who should head the Intersector Scientific and Technical Complex Nefteotdacha, Vakhitov did not become a general. Mikhail Leontyevich Surguchev, a follower of Krylov and a prominent specialist of the petroleum industry, became the head.

The legacy he inherited, as we shall see, is not at all simple. Here there is also a "concealed" dispute with the will of the ministry about the networks. Its resonance is such: not having obtained proper publicity, the problem in a strange way is perceived now in the minds of both supporters and opponents of

Krylov. I conversed with various people. Each of the sides is convinced that he and no other is right. As the result, as Surguchev believes, the only practical course for the siting of wells has not yet taken shape.

As the result, an excessively uncoordinated structure of the institute was also inherited. Consider, nearly every department of the ministry wanted to have the corresponding department in the institute and quite frequently succeeded. This generated about 100 subdivisions, and did it make sense? The main directions of the work were conducted in far from the best way. Basic research died away. The economics department proved to be undisciplined to all intents and purposes. The department which was charged with further improvement of the most important method for increasing the output of a stratum--flooding, has been steadily weakened. The department does not yield promising methods.

The Oil and Gas Scientific Research Institute also before the establishment of the Intersector Scientific and Technical Complex was the head institute in the field of the development of oil fields, engineering, and extraction technology. But did it integrate the forces of the petroleum scientists or did it produce a single consistent policy in the field within its jurisdiction? Far from it. On the basis of this discussion, it is already apparent that there was no talk about unity. And indeed, considerable forces are concerned with oil in our country. There are about thirty institutes in the Ministry of the Petroleum Industry alone. The problem of the successfulness of the work of this "army", naturally, is complicated by the multiplicity of plans and requires special scrutiny. But when I asked the leaders of the Intersector Scientific and Technical Complex which of the finished "foreign" developments show a revolutionizing influence on the sector which it is possible to borrow from today and rapidly begin to develop, I did not obtain a confident answer in so many words.

The intersector connections of scientists are weak and ineffective, Surguchev acknowledges. It is necessary to begin much anew here. Indeed, the head institute not only has not fulfilled its coordinating functions as it should, but also has not been the generator of ideas which could have inspired "collegiality" against departmental barriers. Moreover, not infrequently a distinctive scientific snobbery has appeared by dissociation from what has arisen "elsewhere". It was this way with the developments of the Bashkir Research Institute for the Petroleum and Petrochemical Industry. It proposed using surface-active substances to increase the output of a stratum. The academic institute in Tomsk worked extremely successfully on the intensification of the extraction of petroleum, but its collective also for a long time did not meet understanding from the legislators of the head organization. It is not difficult to find a similar situation also in the interrelations with higher educational science. For many years the Kazan State University has conducted industrial experiments on the regulation of the movement of a liquid in a porous medium of a stratum. Good data have been obtained. Here it would be helpful to enthusiasts to expand this subject matter, but applications for support have not been heard.

What could the sluggish approach of the institute and a weak joining of the forces of scientists lead to in the solution of the most important problems of

the development of petroleum extraction? How was this reflected in the results of the work of the sectors? As we know, the last Five-Year Plan showed results which were far from what was planned; it was assigned to find out the tactics of foam removal. The examples of what appeared in the Samotlar blowout is confirmation of this.

Now the oil field workers are discovering simple truths for themselves: one cannot use old measures for redevelopment of poor areas. Drilling technology must be changed. The previous approach to opening up a stratum is hardly acceptable--it clearly deteriorates it. Let us remember only the Sutorminsk deposit in the Tyumen Oblast, where because of the low quality of the drilling, the wells gave water instead of oil. It would be good for the Gorkiy experience to be profited from in the future! But for this, operational analysis, modern information, and sound forecasts are all needed. But all three up to now have not been at the necessary level.

Thus, the sector has not come face to face with new problems for which they are poorly prepared. Help, Intersector Scientific and Engineering Complex! Great hopes rest on you. Leave this legacy in the shortest possible time and go to the most advanced limits. Strive for multistage shortening of the path from science to practice. This is not simple. We were already convinced that the quite new Intersector Scientific and Technical Complex is not a freshly cast mold but a complicated organism with a difficult burden of yesterday's and today's problems. What is needed here is a strong collective of like-minded people who are capable not only of "surviving" in the departmental environment but of accomplishing great work.

A large part of the responsibility, finally, is conferred on the leaders of the Intersector Scientific and Engineering Complex, including the deputies of the general director. But this is what to be on the lookout for: considerable time has passed, and the headquarters of the deputies have been manned only recently. But on the other hand, we shall find the surnames Khalimov and Vakhitov, with which we are already familiar, among the recently confirmed. I vainly attempted to draw from them deep thoughts about the development of the complex and about what should be discarded in its structuring and what should be used. "They fulfill what is entrusted to them. But at the same time, they do not show initiative," thus P. Sadchikov, secretary of the party bureau of the institute, characterized their work. "It does not make for good use of time from such a position: previously it was for day to day needs, and now it is for new and future work?"

I think that the diagnosis is already correct because Vakhitov, previously persecuted by Krylov, likes to repeat now, "Krylov and I obtained..." and that "he is a very respected person with whom my best years were connected." Who will guarantee that in a little while he will not express, "I and Krylov"? And Khalimov, who from the height of his position allowed himself an impermissible tone in contact with a talented scientist, which many people confirm, now nods incomprehensibly on this side: "they ruined a good man".

The complex will stand on its own feet with difficulty. Only just now has the certification at the head institute been completed. Only just now have the leaders of the most important directions of the development of the complex

been appointed. Only just now has the soviet of the Intersector Science and Engineering Complex been confirmed. Only recently has the internal position of it also been confirmed.

Surguchev acknowledges that the paperwork stretches out for a very long period of time. And there is still a considerable amount of it. He says that its sluggishness is conspicuous in this, and not a hand is raised against it; he himself was not appointed in the first days of the establishment of the complex, as it would have been expected but only several months later. He would have been able to begin more strongly to take up specific problems. "I want this, but it is still impossible," the general director shakes his head.

Much here depends on the approach to the work of the ministry and the USSR State Committee for Science and Technology. The leadership of the ministry was recently reformed, and previous methods for directing science are being dropped. But there is much still to be eliminated and eliminated. It is as if one has to twist an arm to come to an agreement on the whole contract in a large number of instances. How, for example, was the working plan of the Intersector Scientific and Technical Complex agreed upon? Surguchev says that they bypassed the members and settled everything. On the contrary, no, instructions are received: let us comply with them in the technical managements of all the ministries. What is the purpose, he asks, of this procedure when the plan was envisaged on the level of the head organizations of the same ministries?

It is apparent that the party organization must also have a special role in the structuring of the complex. Now we do not have simply to overcome what communists previously agreed to, by not opposing Vakhitov's policy, which is far from collegiality. There has to be a new basis for joining the forces of the party organization of ten institutes and members of the complex and to set right the closest relationships with the party committees of the three scientific production associations entering into the composition of the Intersector Scientific and Technical Complex.

The first steps are always the most difficult. Let them be not very certain at first, and let them have to correct them. It is important in order to lead them to the goal. In order then not to have to settle for one of them. And this means that disputes must be exclusively scientific, interests must be devoid of personal profit, and the work must be worthy of good words.

12410

CSO: 1841/127

UDC 662.667

DIELECTRIC PERMEABILITY OF ANTHRACITES OF DIFFERENT DEPOSITS

Moscow KHIMIYA TVERDOGO TOPLIVA in Russian No 6, Nov-Dec 86 (manuscript received 11 Oct 85) pp 14-17

[Article by L.V. Gorbaneva, F.G. Zhiyangulova and Ye.P. Tretyakova, State Scientific Research and Drawing and Design Institute of the Electrode Industry]

[Abstract] A method of measuring dielectric permeability during high-speed assessment of the suitability of anthracites as filler in electrode production with use of a UK-68 resonance dielectric permeability meter is described and discussed. The method is highly sensitive and rapid with relative error of determination of less than 10 percent. Use of the method revealed relationships between dielectric permeability and other properties of anthracites such as reflective power, microhardness, texture coefficient, density of the material and relationships of crystallites sizes. The dependence of dielectric permeability on the petrographic composition and degree of metamorphism of anthracites was discussed. Results of the dielectric measurements provided data which can be used to evaluate anthracites presently making up the raw material base of electrode production. Figures 4; references 3 (Russian).

2791/9716

CSO: 1841/96

UDC 662.75

STABILITY OF LIQUID PRODUCTS OF HIGH-SPEED PYROLYSIS OF BROWN COALS

Moscow KHIMIYA TVERDOGO TOPLIVA in Russian No 6, Nov-Dec 86 (manuscript received 4 Apr 86) pp 61-64

[Article by I.V. Molchanova, V.F. Kornileva, O.N. Barsagova and L.I. Solovyeva, State Scientific Research Power Institute imeni G.M. Krzhizhanovskiy]

[Abstract] Thermostability of light resin and gasoline fraction of Kansk-Achinsk coals was studied after 1, 3 and 6 months storage under normal

conditions and after storage of light resin samples with stabilizers added. Ionol(4-methyl-2,6-di-tert-butyl-phenol) in a quantity of 0.05 percent by weight was used as stabilizers. Traditional stabilizers used in petrochemistry were ineffective. Chromatographic study of phenols, isolated from light resin samples with and without addition of stabilizers and of phenols from light resins, heated for 10, 20 or 48 hours, showed that the quantity of xylenols decreased. The study showed that resins of high-speed pyrolysis of Kansk-Achinsk coals are unstable products and that storage and prolonged heating change the composition and properties of the resins. Use of typical ionol type stabilizers was ineffective. Heating the light resin produced a loss of valuable phenols. Light resins and products from its refinement can be pumped through pipelines which are heated to reduce viscosity of the products but the pipelines should be detachable in order to make it possible to remove coal tar and other deposits. References 2 (Russian).

2791/9716
CSO: 1841/96

UDC 662.6:621.311-611.001.5

EFFECT OF ROCK ADMIXTURES DURING OPEN-PIT MINING ON SMELTING CHARACTERISTICS OF ASH FROM KANSK-ACHINSK COALS

Moscow KHIMIYA TVERDOGO TOPLIVA in Russian No 6, Nov-Dec 86 (manuscript received 5 Nov 85) pp 123-127

[Article by A.S. Zavorin and A.N. Merzlyakov, Tomsk Polytechnic Institute]

[Abstract] A study of the effect of rock admixtures on chemical compositions of ash from coal mines at Kansk-Achinsk deposits showed that such admixtures change the feasibility and viscosity of the molten ash. Fusibility of the ash depends upon the amount of rock admixtures, the rock facies and the composition of the initial coal. Rock admixtures within limits of $\Delta A^d \leq 10\%$ percent resulted in the lowest temperature of the fluid state of coal. Greater ballasting of the coal increased the refractoriness of the ash. Rock admixtures should not exceed 2.5 percent of the total volume of the dry coal. This ratio may be achieved at the mine or by addition of appropriate coals at the power plant. Figures 3; references 9 (Russian).

2791/9716
CSO: 1841/96

USE OF LIQUID CRYSTALS IN THERMOMETERS

Moscow SELSKAYA ZHIZN in Russian 9 Dec 86 p 1

[Text] The Kharkov Chemical Reagent Plant has begun to produce thermometers based on liquid crystals. These thermometers do not have traditional scales or glass tubes with liquid. The temperature of air causes clear colored numbers to glow on a dark polymer film.

This is the secret: enclosed inside the film is the thinnest layer of liquid crystals. They also have the ability to change color, depending on the intensity of heat radiation.

"Everyday thermometers are one of the practical applications of developments at our institute," says the director of the laboratory at the All-Union NII [Scientific Research Institute] of Monocrystals, V. Tishchenko. "The possibilities for thermoindicator films are widespread. If you apply a piece of this film to your finger, for example, a rainbow-colored spot immediately appears at the point of contact. This is a thermogram. Every shade of color corresponds to a particular temperature of the skin's surface. At the same time, a difference is detected to one-hundredth of a degree.

"In conjunction with medical technicians we have developed and prepared for production a whole range of thermoindicators for physicians and hospitals."

/9716

CSO: 1841/121

UDC 541.(64+24):542.952

FEATURES OF HEAT WAVE PROPAGATION DURING THERMAL POLYMERIZATION OF VINYL MONOMERS

Moscow KHIMICHESKAYA FIZIKA in Russian Vol 5, No 10, Oct 86 (manuscript received 11 Dec 85) pp 1421-1425

[Article by A.S. Babadzhanyan, N.F. Surkov, A.S. Segal, G.V. Zhizhin and S.P. Davtyan, Chernogolovka Department of the Institute of Chemical Physics, USSR Academy of Sciences]

[Abstract] A theoretical study of radical polymerization of vinyl monomers during thermal initiation with spread of the adiabatic front of the reaction is described and discussed. The limits of applicability of an approximation of the narrow zone of reaction as a function of the order of magnitude of the reaction for the monomer was determined under the same conditions and expressions for the stationary velocity of spread of the front for the narrow and wide zones of the reaction in the presence and in the absence of the gel-effect were obtained. Conditions of established stationary propagation of the wave in the presence and absence of the gel-effect were obtained. The rate of spread of the thermal polymerization wave under identical initial temperatures was about one order of magnitude lower than the rate of spread of the wave of initiated polymerization. For processes of polarization, the presence of accelerating factors expands the region of applicability of approximation of the narrow zone of the reaction and correct results for determining the wave velocity may be obtained at orders of magnitude of the reaction greater than one. Figures 3; references 11: 9 Russian, 2 Western.

2791/9716

CSO: 1841/58

CREATION OF PROGRESSIVE POLYMER MATERIALS

Moscow PLASTICHESKIYE MASSY in Russian No 1, Jan 87 pp 3-4

[Article by R.A. Mkrtchyan and V.I. Goldberg]

[Abstract] Structural thermoplastics are among the most effective polymer materials, intended for the manufacture of loaded parts and elements of mechanisms for use at temperatures up to 250°C. Significant success was achieved during the 11th Five-Year Plan in the development of the production of such engineering thermoplastics. New double-snake granulators have been put in use for polycarbonate. A combined program of scientific research and development work is under way on the creation of new resource-conserving low- or no-waste technological processes with fewer stages, using more effective equipment and automation to decrease costs by a factor of 2.7, capital investment by a factor of 1.8, power consumption by a factor of 1.5 and materials consumption by a factor of 1.4. By the end of the 12th Five-Year Plan the assortment of such engineering plastics will be expanded, 1.5 to 2 times, which will be followed by a subsequent expansion of yet another 2 to 3 times. New, large, industrial base enterprises must be constructed for the manufacture of such products. Effective utilization of these products is a necessity as well.

6508/9716

CSO: 1841/176

UDC 678.5:536.495:539.4

BRITTLE FRACTURE OF THERMOSTABLE POLYMERS AT CRYOGENIC TEMPERATURES

Moscow PLASTICHESKIYE MASSY in Russian No 1, Jan 87 pp 11-12

[Article by T.S. Shcherbakova, A.P. Makushkin, L.I. Chudina, A.I. Semenova, A.P. Kiselev and M.A. Myagkob]

[Abstract] A study is made of the brittle fracture resistance of block specimens of thermally stable aromatic amorphous polymers suitable for use at cryogenic temperatures. Polymers studied included polycarbonate, polysulphon, polyamidoimide, polyamide and polybutylene terephthalate. Aromatic polyesters were found to have the highest value of σ_b at 293 and 77 K. Aromatic polyamides, polyamidoimide and polybutylene terephthalate have the lowest values of σ_b . The mechanical properties of the polymers at very low temperatures are determined not only by the aromatic nature of the molecular structure and the presence of an amorphous phase, but also by the flexibility of the main chain and the depth of structural-chemical processes occurring during processing of the polymer. Figure 1; references 6 (Russian).

6508/9716

CSO: 1841/176

POLYMER COMPOSITE MATERIAL WITH ELECTRICAL CONDUCTIVITY

Moscow PLASTICHESKIYE MASSY in Russian No 1, Jan 87 pp 23-24

[Article by L. G. Glukhova, S. Ye. Artemenko, V.S. Fisenko, R.M. Levit, V. N. Pershikov and O.V. Kuramina]

[Abstract] A study is made of the influence of the content of carbon fibers in composite materials with hybrid filler on electrical conductivity to evaluate their use as electrodes and heating elements. The reinforcing fillers used were hardened viscose fiber waste. The polymer composite materials with these fillers and conducting fillers of carbon fibers were found to have good physical-mechanical and conductive properties, making them suitable for manufacture of molds and inserts in decks designed for the formation of concrete products by direct electric heating or for transmission of heat by convection from the thermally active mold wall. Figures 2; references 7 (Russian).

6508/9716
CSO: 1841/176

UDC 678.5.002.6:541.64

STUDY OF TIME EVALUATION OF INFORMATION FLOW ON PLASTICS (REVIEW)

Moscow PLASTICHESKIYE MASSY in Russian No 1, Jan 87 pp 57-58

[Article by Yu. S. Lipatov, L. V. Denichenko and M. P. Rodina]

[Abstract] An analysis of the published and patent literature reveals a constant trend toward reduced information flow and number of publications in the area of plastics. Analysis of the internal Soviet structure of information flows between 1979 and 1983 reveals three main areas: Production and application of plastics, plastic products, and processing of plastics. With the total decrease in number of publications, those on production and application of plastics remained constant throughout this period. A graphic method was used to analyze the information flows for the Soviet Union, Japan and the West for the same period. The reduction in numbers of publications and patents is not typical of science in general. Figures 2; references 8: 7 Russian, 1 Western.

6508/9716
CSO: 1841/176

USE OF AMINOIMIDOAZOLINES IN FAST-CURING EPOXY COMPOSITIONS

Moscow PLASTICHESKIYE MASSY in Russian No 1, Jan 87 pp 46-47

[Article by V. I. Lukashova, O.L. Kreynin, G.B. Birchanskaya and L.M. Tereshko]

[Abstract] A study was made of the possibility of using low-viscosity aminoimidoazolines with comparatively-low specific exothermic effect during curing of epoxy resin in fast-curing compositions. Compositions based on epoxy diene type ED-22 resin were cured with low-viscosity aminoimidoazolines. The use of the low-viscosity aminoimidoazoline in quantities of 50-70% of the theoretical stoichiometric quantity yielded fast-curing epoxy compositions with good physical-mechanical and dielectric properties. Figure 1; references 7 (Russian).

6508/9716
CSO: 1841/176

UDC 541.64:539.2:699.017

STUDY OF STRUCTURAL CHANGES IN POLYIMIDE FILMS EXPOSED TO LASERS

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 291, No 6, Dec 86 (manuscript received 12 Feb 86) pp 1399-1402

[Article by B.A. Vinogradov, N.V. Mikhaylova, V.B. Kopylov, Yu. I. Shmagin, Yu. G. Baklagina, A. I. Koltsov and A. V. Sidorovich, M. M. Koton, corresponding member, USSR Academy of Sciences, and V. P. Lyubovitskiy, Institute of High Molecular Weight Compounds, USSR Academy of Sciences, Leningrad; Leningrad Institute of the Textile and Light Industry imeni S. M. Kirov]

[Abstract] Results are presented from spectroscopic and x-ray studies of structural changes occurring upon exposure of films of poly-(4, 4'-oxidi-phenylene) pyromellitimide (PM) to laser light. Specimens were exposed to monochromatic radiation of lasers operating in the continuous mode. Analysis of spectra of initial and laser-treated films of PM showed that the characteristic imide bands are practically unchanged by laser radiation. The light of the CO₂ laser, in contrast to the YAG laser, excites primarily oscillating states of high molecular weight systems, equivalent to rapid heating to high temperatures. IR spectra indicated that rapid heating of polyimide films produced practically the same quantitative changes as the CO₂ laser. Figures 2; references 9: Russian.

6508/9716
CSO: 1841/159

SELECTIVE LASER EXCITATION OF ORIENTED MOLECULES IN POLYMER MATRICES

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 291, No 6, Dec 86
(manuscript received 26 Feb 86) pp 1421-1424

[Article by V. V. Nekrasov, R. N. Nurmukhametov, A. S. Starukhin, I. V. Stanishevskiy, D. N. Shigorin and A. M. Shulga, Scientific Research Physical-Chemical Industry imeni L. Ya. Karpov, Moscow; Institute of Physics, BSSR Academy of Sciences, Minsk]

[Abstract] A study is made of the specifics of the fine structure spectra and polarization fluorescence in selective laser excitation of molecules inserted into oriented polyethylene films. Studies were performed on oxyderivatives of 9, 10-anthroquinone, naphthoquinone, thioindiga and certain porphyrins. Studies were performed at 4.2 K. It was found that the oriented PE films are suitable matrices for the study of the fine structure spectra and emission anisotropy upon selective laser excitation of complex molecules of widely-varying chemical structure. Figures 3; references 12: 9 Russian, 3 Western.

6508/9716
CSO: 1841/159

UDC 541.64:539.2

STUDY OF PROPERTIES OF BOUNDARY LAYERS OF EPOXY ADHESIVES AND POSSIBILITIES OF REGULATION

Moscow VYSOKOMOLEKULYARNYYE SOYEDINENIYA in Russian Vol 28, No 11, Nov 86
(manuscript received 18 Mar 85) pp 2259-2264

[Article by Yu. S. Lipatov, A. Yu. Filipovich and R.A. Veselovskiy, Institute of Chemistry of High Molecular Weight Compounds, USSR Academy of Sciences]

[Abstract] The process of formation of adhesive layers located 0.01-20 μm from a high energy or low energy surface is described and discussed and possibilities of regulating adhesive properties of epoxy polymers are examined. An incompletely-hardened polymer layer arose during formation of glues on a high-energy backing and this reduced the adhesive strength of epoxy glues. Formation of a boundary layer of incompletely hardened glue did not occur when gluing surfaces with low surface-energy but inadequate moistening of the glues on the backing prevented attainment of high adhesion strength. The main feature of polymer-high energy surface interaction in the process of formation of epoxy polymer during reaction on the surface was the formation of an intermediate underhardened layer on it due to adsorption of reagents by the surface. Only elimination of the underhardened layer by temperature change, change of chemical composition of the adhesive layer and addition of surfactants can increase the adhesive properties of the

epoxy glues. The study confirmed the great effect of the boundary layer structure of the epoxy resins on their adhesive properties. Figures 6; references 12 (Russian).

2791/9716

CSO: 1841/118

UDC 541.64:539.28

DIELECTRIC ANOMALIES IN POLYMER-METALLIC FILLER SYSTEMS

Moscow VYSOKOMOLEKULYARNYYE SOYEDINENIYA in Russian Vol 28, No 11, Nov 86
(manuscript received 1 Apr 85) pp 2355-2360

[Article by A.V. Stafeyev, A.B. Sazhina, K.A. Boytsov, V.B. Saltanova and Ye.V. Kharitonov, Leningrad Polytechnic Institute imeni M.I. Kalinin]

[Abstract] Dielectric properties of polymer-metal compositions are discussed and a search for materials with high value of dielectric permeability in the superhigh frequency range is described. Compositions of a copolymer of ethylene and vinylacetate with Ni, Fe, Cu, Al and T-10,000 ferroelectric ceramics based on barium titanate are studied. Concentration and concentration-frequency dependences of the dielectric permeability and the loss tangent of a dielectric of the polymer-metal compositions are discussed. Dielectric characteristics of these systems are explained within the framework of the flow theory in the effective medium approximation. Figures 3; references 10: 9 Russian, 1 Western.

2791/9716

CSO: 1841/118

UDC 541(64+126)

FEATURES OF ACTION OF HALOGEN-CONTAINING FIRE RETARDANTS IN POLYETHYLENE

Moscow VYSOKOMOLEKULYARNYYE SOYEDINENIYA in Russian Vol 28, No 11, Nov 86
(manuscript received 2 Apr 85) pp 2361-2367

[Article by S.N. Novikov, L.A. Oksentevich, A.A. Kuznetsov, G.S. Ivanova, A.M. Mustafayev and A.N. Pravednikov, deceased, Scientific Research Physico-chemical Institute imeni L.Ya. Karpov]

[Abstract] A study of the effect of different classes of halogen-containing organic compounds on thermal decomposition and combustion of polyethylene is described and discussed and peculiarities of thermal dehalogenation of these compounds in the presence of antimony trioxide discussed. The compounds studied affected the direction of thermal conversion of polyethylene differently according to their chemical structure. They produced cross-linking of the polymer or accelerated destructive processes, accompanied by decrease of molecular weight of the polyethylenes. The effectiveness of the halogen-antimony system depended upon the type of polyolefin involved and the

structure of the halogen-containing compound. Factors affecting the synergistic effect of the halogen-containing compound and antimony trioxide system are presented and discussed. The role of each of these factors in the overall fire-retardant effect of the polymer differ according to the structure of the polymer and the halogen-containing compound. Figures 6; references 9: 7 Russian, 2 Western.

2791/9716

CSO: 1841/118

UDC 621.373.826

MORPHOLOGY OF LASER DAMAGE OF POLYMER SURFACE

Moscow POVERKHNOST in Russian No 1, Jan 87 (manuscript received 27 Feb 1986)
pp 59-62

[Article by A. Ye. Chmel, N. P. Leksovskaya and A. M. Kondyrev, Physical-Technical Institute im. A. F. Ioffe, USSR Academy of Sciences, Leningrad]

[Abstract] Electron microscopy was used to study the damage to a polymer surface produced by a laser with single and repeated $1.06 \mu\text{m}$ irradiations at 60 ns durations. Industrial and laboratory-prepared samples of low pressure polyethylene were used. The appearance of a plasma flare on the irradiated part served as a criterion of damage. Energy density Q_* at which damage occurred after a single pulse was utilized as a measure of laser activity. Energy density Q/Q_* was measured from 0.2 to 3.0. For this entire range, sometimes the formation of defects was observed, having the appearance of a deep crater in the center from which large carbon pieces (up to $30 \mu\text{m}$) were dispersed for some distances. A graphic relationship was developed for the number of pulses up to breakdown as a function of energy density of the pulse for laboratory and production samples. Carbon was formed only in the final stage of damage as a product of destruction of the macromolecule. Carbon particles were observed only after surface breakdown with a plasma burst. Carbon formation does not play any role in the initiation of polymer breakdown. In conditions where destruction is obtained without a plasma flare, the defects are characteristic in appearance to those for mechanical failure rather than for heating of the material. There was no penetration, soot or craters from evaporated material. Figures 4; references 6 (Russian).

12886/9716

CSO: 1841/183

ADSORPTION OF LANTHANIDS ON CATION EXCHANGE FIBERS FORMED BY CARBOXYLIC POLYPROPYLENE

Minsk VESTSI AKADEMII NAUK BSSR: SERYYA KHIMICHNYKH NAUK in Russian
No 6, Nov-Dec 86 (manuscript received 17 Mar 86) pp 20-23

[Article by K.F. Paraskevova, I.N. Yermolenko and L.G. Vlasov (dec.), All-Union Scientific Research Institute of Textile and Clothing Industry; Institute of General and Inorganic Chemistry, Belorussian SSR Academy of Sciences]

[Abstract] Studies were conducted on the various parameters characterizing the binding of lanthanoids to polypropylene fibers carrying polyacrylic acid grafts. The data indicated that the affinity and efficiency of the cation exchanger was predicated on the concentration of the polyacrylate components, increasing proportionally to increase in the concentration of the latter on the fibers. Data collected at pH 2.6-4.0 and an ionic strength of 0.5, summarized the concentration of functional groups on the adsorbent, its acidity, and stability constants. Figures 2; tables 1; references 7 (Russian).

12172/9716
CSO: 1841/150

UDC 533.9:541.15:547.313:678.044:678.742

POSTPOLYMERIZATION OF ETHYLENE ON TITANIUM TRICHLORIDE, ACTIVATED BY HIGH-FREQUENCY ELECTRIC DISCHARGE

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 291, No 1, Nov 86 (manuscript received 12 Feb 86) pp 116-119

[Article by A.T. Papoyan, P.Ye. Matkovskiy, N.S. Yenikolopyan, academician, and Kh.-M.A. Brikenshteyn, Department of Institute of Physics, USSR Academy of Sciences, Chernogolovka, Moscow Oblast]

[Abstract] Relatively brief (5-45 minutes) treatment of mixtures of titanium trichloride and a highly-dispersed substance by a low pressure (0.1-10 torr) electric discharge in argon, hydrogen, methane or ethylene in a flow-through regime or under static conditions with intense mixing in a thermostatted reactor produced a highly-active catalyst of gas-phase ethylene postpolymerization at 20-100°C and low pressure (0.1-1.0 atm). The effectiveness of action of a high-frequency discharge on a titanium trichloride-dispersed filler system depended upon the nature of the filler, the nature and pressure of the gas in which treatment occurs, the power of the discharge, the duration of treatment and other factors. The great importance of the highly-dispersed mineral substance in $TiCl_3$ activation by a high-frequency discharge was demonstrated. Systems active in ethylene postpolymerization were formed only when substances containing Brenstedovskiy and Lewis active

centers on the particle surface were used as filler. The postpolymerization process evidently proceeded on active centers which form as a result of reaction of derivatives of titanium in lower stages of oxidation with ethylene without participation of organometallic compounds. Figures 3; references 4: 3 Russian, 1 Western.

2791/9716
CSO: 1841/111

UDC 539.23:678.742

TRANSCRYSTALLIZATION IN POLYETHYLENE COATINGS

Kiev DOKLADY AKADEMII NAUK UKRAINSKOY SSR: SERIYA B, GEOLOGICHESKIYE, KHIMICHESKIYE I BIOLOGICHESKIYE NAUKI in Russian No 11, Nov 86 (manuscript received 17 Jun 86) pp 44-48

[Article by V.P. Privalko, R.Ya. Deberdeyev, N.L. Rymarenko, O.P. Shmakova and Yu.S. Lipatov, academician, UkSSR Academy of Sciences, Institute of Chemistry of High Molecular Weight Compounds, UkSSR Academy of Sciences, Kiev]

[Abstract] A study of formation of the transcrystalline layer in polyethylene coatings on solid substrates of different nature provided quantitative parameters of time and temperature conditions of formation of a transcrystalline layer of specific thickness in polyethylene coatings. Systems studied included low density polyethylene on substrates steel 3, steel 10, steel ChZh, aluminum, duraluminum, copper, titanium, tungsten, fluoroplast-4, silicate glass, ceramics, ebonite and wood and high density polyethylene on steel ChZh-1 and fluoroplast-4. Powdered polymers (low density polyethylene mark 16803-070 and high density polyethylene mark 20806-024) were applied to a cold substrate rolled to required thickness (of the order of 1-10 μm) and held for different times at a constant temperature in the 303-513 K range with an accuracy of $\pm 1\text{K}$ and cooled in air or water thermostats or in a water-ice-table salt mixture. Conditions of formation of the transcrystalline layer were established. Its extent may change within the 30-150 μm range and the morphology of the acicular crystals is not the same even for one and the same backing. Acicular crystals formed at considerable distances from the interface (up to dozens of μm) in all substrates during formation of coatings in the high temperature region. This indicated that a transcrystalline layer may form not only directly on the solid surface but also on the intermediate polymer layer. Figures 4; references 5: 3 Russian, 2 Western.

2791/9716
CSO: 1841/101

CROSS LINKING OF VINYL SILOXANE ELASTOMERS WITH ORGANOHYDROSILOXANES IN HYDROSILYLATION REACTION

Moscow KAUCHUK I REZINA in Russian No 11, Nov 86 pp 6-9 (Cat. 25)

[Article by A.V. Korshkov, V.M. Kopylov, A.A. Dontsov and L.Z. Khazen]

[Abstract] In comparison to traditional peroxide vulcanization, cross linking of vinyl siloxane elastomers with organohydrosiloxanes in the hydrosilylation reaction increases tear resistance and improves the sanitary-chemical properties of rubbers, eliminating in many cases the final vulcanization stage. Organohydrosiloxanes of the general formula $\text{Me}_3\text{Si} [\text{OSi} (\text{H}) \text{Me}]_n \text{OSiMe}_3$ were used as cross-linking agents, with platinum bis(trioctylbenzylammonium) tetranitrite as cross-linking catalysts. All the compounds studied were effective cross-linking agents, providing rapid cross linking of compositions and good strength properties. In addition to the major reaction of cross linking due to hydrosilylation of the vinyl groups, a number of secondary reactions also occur in this process, including interaction of silicohydride groups of the organohydrosiloxane with oxygen and traces of moisture present in the rubber and silanol groups of the rubber. The combination of organohydrosiloxanes and platinum bis(trioctylbenzylammonium) tetranitrite is an effective system for vulcanization for polydimethylmethylvinylsiloxanes and allows the production of rubbers with a good combination of technological and usage properties for application primarily in the manufacture of medical products. Figures 5; references 8: 6 Russian, 2 Western.

6508/9716

CSO: 1841/136

CONTACT OXIDATION AND CROSS-LINKING OF ISOPRENE RUBBER ON METALS

Minsk VESTSI AKADEMII NAUK BELARUSKAY SSR: SERYYA KHIMICHNYKH NAUK in Russian No 5, Sep-Oct 86 pp 120-121

[Authors: I. M. Yeliseyeva, D. G. Lin and V. G. Sviridenko, Gomel State University]

[Text] The thermal oxidation and oxidative cross-linking of isoprene rubber films in contact with metals used as fillers and supports for coatings are studied. It is shown that the amount of catalytic activity of the metals in the process of oxidizing filled-rubber depends not only on the nature of the metal-filler but also on its content in the film and the duration of oxidation. Catalytic oxidation of rubber with metals exhibits not only a much higher rate in the accumulation of carbonyl groups, but a faster development in the processes of destruction and formation of the macromolecule.

Contact thermal oxidation of polyisoprene on catalytically active supports is accompanied by dissolution and transfer of the metal into the body of the film where as a rule, the higher the catalytic activity of the support, the faster the metal accumulates in the film. Oxidation of rubber on metal alloys (brass, Kovar) is accompanied by dissolution of all components of the alloy.

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/9716

CSO: 1841/122

UDC 541.127.141,621,375.826

REACTION RATE CONSTANT OF LASER INDUCED Na(3P) + HCl REACTION

Moscow KHIMICHESKAYA FIZIKA in Russian Vol 5, No 12, Dec 86 (manuscript received 18 Dec 1985) pp 1610-1617

[Article by S. K. Borisov, B. B. Krynetskiy, V.A. Mishin, A.M. Prokhorov and O. M. Stelmakh, Institute of General Physics, USSR Academy of Sciences, Moscow]

[Abstract] A method is examined for the direct measurement of the rate constant of a chemical reaction of excited atoms with molecular reagents according to the kinetics of luminescence, which occurs during excitation of atomic transition with laser radiation. The rate constant was measured for $\text{Na}(3\text{P}) + \text{HCl} \rightarrow \text{NaCl} + \text{H}$, which was induced with radiation of a reconstituted laser on the dye Rhodamine 6G. Ar was used as a buffer gas. Experimental results and the theoretical analysis of the kinetics of the processes are presented for a tri-level model with calculation of a rapid intra-Doppler relaxation. Data for luminescence kinetics of Na in the presence of HCl, kinetics of the processes in a laser reactor with Ar pressure of 80 torr, and rate constant as a function of HCl concentration are given. The rate constant of the bimolecular reaction $k_b = k/(\text{HCl})$ was $(0.93 \pm 0.1) \cdot 10^{-9} \text{ cm}^3/\text{s}$ at (HCl) concentration $= 7.5 \cdot 10^{13}/\text{cm}^3$ and $k = (7 \pm 1) \cdot 10^4/\text{s}$. It was determined from the beginning part of the curve of the damping of luminescence in the presence of the molecular reagent. The average cross-section of the process was $\bar{\sigma} = 100 \text{ \AA}^2$ for the greatest probable relative rate of atom-molecular collision of $\bar{v} = 9 \cdot 10^{10} \text{ cm/s}$. This agrees well with the literature value for the cross-section of luminescence quenching of 88 \AA^2 . This confirms that the basic channel of luminescence quenching in this system is the channel of chemical reaction. Figures 5; references 8: 2 Russian, 6 Western.

12886/9716

CSO: 1841/184

COMPOSITION AND RADIATIVE-CHEMICAL YIELDS OF RADICAL PRODUCTS FOR RADIOLYSIS OF ACETATES

Moscow KHIMICHESKAYA FIZIKA in Russian Vol 5, No 12, Dec 86 (manuscript received 11 Dec 1985) pp 1626-1630

[Article by A.A. Supe, V. Ye. Zubarev and L. T. Bugayenko, Chemical Faculty, Moscow State University imeni M. V. Lomonosov]

[Abstract] The composition and yields of radical products of the radiolysis of acetates of alkali and alkaline earth metals and of zinc and cadmium were determined with an electron paramagnetic method at 77 and 300°K. Acetates of Li, Na, K, Cs, Mg, Ca, Sr, Ba, Zn and Cd and some of their mono, di, tri and tetrahydrates were studied. With irradiation of these salts with γ -rays of ^{60}Co , radicals $\dot{\text{C}}\text{H}_3$, $\dot{\text{C}}\text{H}_2\text{COO}^-$ and $\text{CH}_3\dot{\text{C}}\text{OO}^{2-}$ are formed at 77°K and $\dot{\text{C}}\text{H}_2\text{COO}^-$ and $\dot{\text{C}}\text{O}_2$ at 300°K. The basic radical stabilized in the crystal hydrates at 77°K is the radical $\dot{\text{C}}\text{H}_3$ (from 50 to 100% of the total yield), but its yield in the water free acetates is significantly lower. The anion-radicals $\dot{\text{C}}\text{H}_2\text{COO}^-$ and $\text{CH}_3\dot{\text{C}}\text{OO}^{2-}$ are the basic paramagnetic centers in the acetates of the alkali-earth metals at 77°K. At 300°K a higher total yield of paramagnetic centers is observed in the crystal hydrates in comparison to the water free acetates except for Ba and Sr. In Ca, Ba and Sr acetates in both the hydrates and water-free salts, a noticeable amount (up to 30%) of anion-radical $\dot{\text{C}}\text{O}_2$ is formed. The nature of the cation, the presence of crystallization water, and the irradiation temperature have a determining effect on the observed proportion of yields of paramagnetic centers and on their total yields during radiolysis of acetates. The total yield of radical products is increased with a rise of the free volume in the crystalline matrix. The mechanism for the radiolysis of acetates is considered on the basis of the obtained experimental data. Figures 2; references 30: 8 Russian, 22 Western.

12886/9716

CSO: 1841/184

UDC 547.787.2'732:543.422:541.651

HETARYLETHYLENE DERIVATIVES OF 2,5-DIARYLOXAZOLES AND 2,5-DIARYLOXADIAZOLES AND THEIR LUMINESCENT AND SCINTILLATION PROPERTIES

Riga KHIMIYA GETEROTSIKLICHESKIKH SOYEDINENIY in Russian No 9, Sep 86 (manuscript received 11 Jun 85) pp 1267-1270

[Article by L.Sh. Afanasiyadi, L.D. Patsenker, S.A. Verezubova, A.P. Shkumat and V.K. Polyakov, All-Union Scientific Research Institute of Single Crystals; NPO "Monokristallreaktiv", Kharkov; Kharkov State University imeni A.M. Gorkiy, Kharkov]

[Abstract] Some new organic luminophores were synthesized, by the Wittig reaction, from 2-(4-bromomethylphenyl)-5-phenyloxazole or -oxadiazole 1,3,4

and different heterocyclic aldehydes containing a thiophene cycle. Optimal conditions for performing the synthesis were described. Adsorption spectra and fluorescence in toluene were measured. Scintillation characteristics of the substances were described. The effect of the electron nature of substituents on the spectral-luminescent properties of the synthesized compounds was discussed. References 9: 6 Russian, 3 Western.

2791/9716

CSO: 1841/105

UDC 541.125

VIBRATIONALLY-EXCITED CS RADICALS IN FLUORINE FLAME AND METHYLMERCAPTAN FLAME

Moscow KHIMICHESKAYA FIZIKA in Russian Vol 5, No 10, Oct 86 (manuscript received 28 Nov 85) pp 1416-1420

[Article by V.G. Fedotov, Institute of Chemical Physics, USSR Academy of Sciences, Moscow]

[Abstract] Equations expressing the possible mechanism of formation of CS radicals in a fluorine and methylmercaptan flame are presented and discussed; the rate of vibrational relaxation of these radicals is measured and the possibility of producing CS outside the flame in free form discussed. Radiation of vibrationally-excited CS radicals appeared in the infra-red spectrum of radiation of the fluorine and methylmercaptan flame. Addition of bromine vapors to the flame increased 5-6-fold the intensity of radiation of the excited radicals. The appearance of CS ($v=1,2$) radicals in a $\text{CH}_3\text{S} + \text{F}_2 \rightarrow \text{F} + \text{HF} + \text{H}_2 + \text{CS}(v)$ reaction is discussed. Radicals disappeared in a $\text{CS} + \text{HS} \rightarrow \text{CS}_2 + \text{H}$ reaction. Destruction of the CS radicals upon addition of bromine, when the concentration of HS radicals decreases, was attributed to gas-phase polymerization of them. It was found that $\text{F}_2 + \text{CH}_3\text{SH} + \text{Br}_2$ and $\text{F}_2 + \text{CS}_3 - \text{S} - \text{S} - \text{CH}_3$ may be used to produce CS radicals in free form. Figure 1; references 9: 4 Russian, 5 Western.

2791/9716

CSO: 1841/58

PAPER COMPOSITES AND THEIR USES

Moscow LESNAYA PROMYSHLENNOST in Russian 22 Nov 86 p 2

[Article from TASS: "Paper Tubes"]

[Text] A piece of paper was brought to a fire. It did not ignite because it was made of a material capable of withstanding temperatures higher than 1000 degrees. Such heat resistance was imparted to it by specialists of the Ukrainian Scientific Research Institute for Cellulose and Paper Industry of the USSR Ministry of Forest and Paper Industry.

"Currently, research establishments of our industry are actively working in a new direction--the development of composite materials as a substitute for paper", relates V. Shevchenko, head of the institute's scientific and industrial laboratory. "These materials, which are made with the use of mineral and synthetic fibers, films, and other components, are used in various branches of the industry and replace expensive natural raw materials."

For example, laminated paper is used instead of perforated tapes and cards, greatly prolonging the service life of computer software. It can also be used in the manufacture of air ducts for greenhouses. Paperboard pipes almost do not lose heat, and this means that greenhouses will be heated more uniformly. Currently, an experimental shop for the production of such pipes is being constructed at the Kiev Paperboard Combine. This shop will make it possible to satisfy the demand for these pipes by the oblast greenhouse farms.

Composite paper can also be used for other purposes, for example, in the production of electrically insulating materials, high- and low-temperature materials, and special filters.

12973/9716

CSO: 1841/71

UDC 541.64:539.199

COMPUTER SIMULATION OF CELLULOSE BY METHODS OF MOLECULAR AND BROWNIAN DYNAMICS

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 291, No 1, Nov 86 (manuscript received 28 Jan 86) pp 157-162

[Article by P.G. Khalatur, G.N. Marchenko, S.G. Pletneva and G.M. Khrapkovskiy, Kalinsk State University]

[Abstract] Computer simulation of a cellulose macromolecule was used to investigate the dynamics of small-scale conformational reconstruction of this macromolecule. Calculations were performed on a macromolecule consisting of eight repeating fragments. Molecular and Brownian dynamics of cellulose were studied. The cellulose macromolecule retained a highly elongated conformation throughout the numerical experiment due to geometric features of the polymer chain and intramolecular hydrogen bond. The atoms performed extremely intense thermal movements. Collective movements of the atoms were described by use of dihedryl angles of internal rotation. The numerical experiments graphically demonstrated processes of collective movements of atoms in the cellulose macromolecule and revealed some quantitative characteristics of the dynamics of such processes. Figures 3; references 9: 5 Russian, 4 Western.

2791/9716

CSO: 1841/111

UDC 547.738.07

SYNTHESIS AND PROPERTIES OF BIS(VINYLENEDITHIO)- AND BIS(DIMETHYLVINYLENE-DITHIO)TETRATHIAFULVALENES

Riga KHIMIYA GETEROTSIKLICHESKIKH SOYEDINENIY in Russian No 11, Nov 86
(manuscript received 5 Apr 85) pp 1470-1473

[Article by Ya.N. Kreysberga, R.S. Medne, A.S. Edzhinya, M.V. Petrova
and O.Ya. Neyland, Riga Polytechnic Institute imeni A.Ya. Pelshe]

[Abstract] The discovery that bis(ethylenedithio)tetrathiafulvalene triiodide is a superconductor led to a synthesis of the corresponding unsaturated analogs bis(vinylenedithio)tetrathiafulvalene (I) and its tetramethyl derivative (II). Steps are described for the synthesis of I and II via a series of chemical reactions commencing with the zinc complex of 4,5-dithiolate-1,3-dithiol-2-thione (III). The initial stages involved alkylation of III with alpha,beta-dibromoethyl or alpha-chloro-bromodiethyl acetates, with the formation of the respective acetoxy- and ethoxyethylenedithio-1,3-dithiol-2-thiones. The latter were heated in selected solvents to eventually obtain I and II, for which IR and UV spectral data are provided. Figures 2; references 10: 4 Russian, 6 Western.

12172/9716

CSO: 1841/160

PLENARY SESSION OF CENTRAL GOVERNING BOARD OF ALL-UNION CHEMICAL SOCIETY IMENI D.I. MENDELEYEV

Moscow ZHURNAL VSESOYUZNOGO KHIMICHESKOGO OBSHCHESTVA IMENI D.I.
MENDELEYEVA in Russian Vol 31, No 6, Nov-Dec 86 pp 590-591

[Article by V.I. Kuznetsov, professor, and Z.N. Kozhevnikova, candidate of
chemical sciences]

[Abstract] The regular plenary session of the Governing Board was held in Moscow on June 2, 1986, and dealt with chemical education at the higher educational establishments. The intention was to review and provide recommendations for improving the educational foundations for training chemists and chemical engineers. It was generally agreed that chemical

education must be brought closer to practical practice of chemistry in industry, and that work-study programs are to be encouraged and expanded. In addition, A.A. Pashchenko of the Ukrainian Governing Board of the society pointed to the need for awarding doctorates in chemistry and chemical engineering to qualified graduates in their thirties, rather than in their fifties. The plenary session ended with a resolution calling for "Improvements in Chemical Education at Higher Institutions of Learning and Training of Highly Qualified Specialists for Chemical Industry in Accordance with the Decisions of the 27th Party Congress".

12172/9716
CSO: 1841/129

UDC 547.548.07

N-NITRATION OF PRIMARY AROMATIC AMINES OF POLYNITROCOMPOUNDS AND POLYNITROXYCOMPOUNDS

Leningrad ZHURNAL ORGANICHESKOY KHIMII in Russian Vol 22, No 10, Oct 86
(manuscript received 2 Jul 85) pp 2120-2123

[Article by A.G. Mayants, K.G. Pyreseva and S.S. Gordeychuk, Kuybyshev Polytechnic Institute imeni V.V. Kuybyshev]

[Abstract] Examination of the possibility of N-nitration of aniline derivatives containing SO_2H , COOH groupings in para, meta- and ortho-positions relative to the amine group by polynitrocompounds $\text{C}(\text{NO}_2)_3$, $(\text{O}_2\text{N})_3\text{CC}(\text{NO}_2)_3$, $\text{CH}_3\text{C}(\text{NO}_2)_3$, $\text{C}(\text{NO}_2)_3\text{CH}_2\text{CH}_2\text{CN}$, $\text{C}(\text{NO}_2)_3\text{CH}_2\text{CH}_2\text{COOCH}_3$ and polynitroxycompounds $\text{C}(\text{CH}_2\text{ONO}_2)_4$, $\text{HOCH}_2\text{C}(\text{CH}_2\text{ONO}_2)_3$ is described and discussed. Experiments were performed by adding appropriate polynitro- or polynitroxycompounds to the aniline derivative in aqueous alkalies or in aqueous alkalies-mixed-with-an-organic-solvent. In the presence of the alkaline agents, tetranitromethane, hexanitroethane and pentoerythrite tetranitrate inhibited para- and meta-substituted aromatic amines with formation of corresponding salts of nitroamines. Ortho-substituted amines did not enter into this reaction. References 5: 2 Russian, 3 Western.

2791/9716
CSO: 1841/116

REGULARITIES OF N-NITRATION OF SULFANILIC ACID BY TETRANITROMETHANE

Leningrad ZHURNAL ORGANICHESKOY KHIMII in Russian Vol 22, No 10, Oct 86
(manuscript received 30 Oct 85) pp 2124-2126

[Article by A.G. Mayants, K.G. Pyreseva, S.S. Gordeychuk and T.V. Gordeychuk,
Kuybyshev Polytechnic Institute imeni V.V.Kuybyshev]

[Abstract] Yield of salts of N-nitrosulfanilic, nitroform and the quantity of reacting sodium hydroxide as a function of temperature and pH of the medium during interaction of the sodium salt of the sulfanilic acid and tetranitromethane is studied. The nitroamine yield depended basically on the pH of the medium; the nitration reaction prevailed at $\text{pH} > 12$ while tetranitromethane decomposition prevailed at lower pH values. At pH values of at least 10, processes occurring during interaction of primary amines with tetranitromethane is adequately described by 3 reactions--nitration of the salt of sulfanilic acid and 2 reactions of tetranitromethane decomposition. References: 3 Russian.

2791/9716

CSO: 1841/116

TWENTY-FIFTH ANNIVERSARY OF SOVIET CHEMICAL JOURNAL

Riga IZVESTIYA AKADEMII NAUK LATVIYSKOY SSR: SERIYA KHIMICHESKAYA in Russian
No 6, Nov-Dec 86

[Article by M.V. Shimanskaya: "Twenty-Fifth Anniversary of the Journal IZVESTIYA AKADEMII NAUK LATVIYSKOY SSR. SERIYA KHIMICHESKAYA"]

[Text] The first chemical journal in Latvia IZVESTIYA AN LATVIYSKOY SSR began publication at the end of 1961. The founding of the journal became possible due to the personal contribution of members of the LaSSR Academy of Sciences professors A.F. Iyevinsh, G.Ya. Vanag, S.A. Giller, L.K. Lepin, and A.Ya. Kalnin to the organizational work for its publication and to scientific knowledge; it was prepared under their direction by the scientific schools founded by them both in the LaSSR Academy of Sciences and in the higher institutes of learning of the republic. The results of research on corrosion processes, the reactivity of β -ketones, borate chemistry, the chemistry of furan, ethylenimine and other heterocyclic systems, including complex derivatives of hydroxy- and thioquinoline and organoelemental compounds and the chemistry of lignin and hemicellulose were published on the pages of the journal. Since the end of the 1960's, papers on molecular biology and modern biochemistry, the synthesis of oligopeptides, oligonucleotides, etc., have been published more and more frequently, and in the last 10 years, also on plasma chemistry. B.A. Purin has been editor-in-chief of the journal since 1975. Beginning in 1980, the journal has been publishing reviews of literature data and basic results of the most important directions of the research of Latvian chemists. With rare exceptions, the distribution of papers by sections is rather uniform and reflects the state of research in the republic (Table 1).

The total number of papers published up to 1 Jan 86 comprises 3446. The ratio of publications by the sections analytical, inorganic, organic, and physical chemistry for the last 5 years comprises 1:1.5:3:4.

The somewhat higher proportion of publications on physical chemistry is explained by the wide distribution of physicochemical methods of research frequently involved in work done in the field of inorganic or organic chemistry; according to the significance of the results obtained and the contribution to the methodology of physical chemistry they were included in this section of the journal.

The authors of the papers basically are staff members of the LaSSR Academy of Sciences chemical institutes (Inorganic Chemistry Institute, Organic Synthesis

Table 1. Distribution of Articles by Journal Section

Таблица 1

Распределение статей по разделам журнала

(1) Разделы журнала	1981	1982	1983	1984	1985	1981— 1985	Всего с начала издания журнала (2)
(3) Обзоры	10	4	4	3	8	29	35
(4) Неорганическая химия	24	14	21	17	21	97	572
(5) Физическая химия	45	41	57	51	41	235	841
(6) Аналитическая химия	12	19	15	15	1	62	269
(7) Органическая химия	26	48	33	43	42	192	1184 2901
(8) Письма в редакцию	11	11	9	15	9	55	283
(9) Хроника	16	13	6	9	13	57	84
							643

Key:

1. Journal section
2. Total since the start of publication of the journal
3. Reviews
4. Inorganic chemistry
5. Physical chemistry
6. Analytical chemistry
7. Organic chemistry
8. Letters to the editor
9. News items

Institute, Wood Chemistry Institute) and representatives of the professorial-teaching component of the chemical faculties of the state university imeni P. Stuchka, and in recent years, also staff members of the Biolar Scientific Production Association.

Table 2 shows the distribution of papers submitted by staff members of different organizations in the last 5 years. Data on the previous period were published previously [1,2]. In principle, the character of the distribution has changed negligibly. Papers of staff members of the LaSSR Academy of Sciences have the largest proportion (56.8 percent); 36.3 percent are publications of staff members of higher institutes of learning, and 7 percent are publications of workers at the Biolar Scientific Production Association. The greatest number of publications (1/4 and 1/5 of the total number, respectively) originate from the Inorganic Chemistry and Organic Synthesis Institutes of the LaSSR Academy of Sciences. A relatively small number of publications (~7.5 percent) originate from the Wood Chemistry Institute.

Table 2. Distribution of Publications Among Different Organizations in the Period 1981-1985

Таблица 2

Распределение публикаций между отдельными организациями в период 1981-1985 гг.

(1) Организация	(2) Научные статьи по годам												(5) % от общего числа ста- тей	(6) % по объему
	1981		1982		1983		1984		1985		1981— 1985			
	(3)	(4)	(3)	(4)	(3)	(4)	(3)	(4)	(3)	(4)	(3)	(4)		
	число статей	объем страниц	число статей	объем страниц	число статей	объем страниц	число статей	объем страниц	число статей	объем страниц	число статей	объем страниц		
(7) Институт неор- ганической химии	48	264	27	116	37	177	31	159	26	157	109	873	27,7	26,3
(8) Институт орга- нического синтеза	17	107	34	215	22	162	24	138	35	240	132	862	21,6	26,0
(9) Институт химии древесным	3	15	17	78	6	27	14	73	6	29	46	222	7,5	6,7
(10) По институтам АН ЛатвССР	68	386	78	409	65	366	69	370	67	426	347	1957	56,8	59
(11) Рижский поли- технический институт	29	154	18	99	41	194	34	179	33	173	155	799	25,4	24,1
(12) Латвийский го- сударствен- ный универси- тет	16	81	19	83	8	36	15	89	9	52	67	341	11,0	10,3
(13) По вузам ЛатвССР	45	235	37	182	49	230	49	268	42	225	222	1140	36,3	34,4
(14) НПО «Биолар»	7	37	13	72	12	60	7	32	3	19	42	220	6,9	6,6
(15) Итого	120	658	128	663	126	656	125	670	112	670	611	3317	—	—

Key:

1. Organization
2. Scientific papers by years
3. Number of papers
4. Number of pages
5. Percent of the total number of papers
6. Percent by numbers of pages
7. Inorganic Chemistry Institute
8. Organic Synthesis Institute
9. Wood Chemistry Institute
10. By LaSSR Academy of Sciences institutes
11. Riga Polytechnic Institute
12. Latvian State University
13. By LaSSR higher institutes of learning
14. Biolar Scientific Production Association
15. Total

The fact that two specialized All-Union chemical journals, *KHIMIYA GETEROTSIKLICHESKIKH SOYEDINENIY* and *KHIMIYA DREVESINY*, which publish a considerable number of papers by chemists of the republic (more than 10 percent of the pages) undoubtedly has an effect on the distribution of papers among the institutes [3].

The journal *IZVESTIYA AKADEMII NAUK LATVIYSKOY SSR. SERIYA KHIMICHESKAYA* publishes multiple series papers: after a series on the chemistry of 8-mercaptoquinoline derivatives (Yu.A. Bankovskiy), on the chemistry of indan-diones (G.Ya. Vanag) and of furan (S.A. Giller), and on the theory of the corrosion of metals (L.K. Lepin) and of the electrodeposition of metals (B.A. Purin), which were published from the first years of publication of the journal and are continued at the present time, a series of papers have appeared on the gas-liquid chromatography of amines and nitrogen-containing heterocycles (A.A. Anderson), research in the field of organoelemental derivatives of heterocycles (E.Ya. Lukevitz), quinone imines and quinoid macrocycles (Ya.F. Freymanis), butenolides and enzyme substrates (E.Yu. Gudrinietse), phthal-ylidenacetic acid chlorides (O.Ya. Neyland), the development of new glass formations (Yu.Ya. Eyduk and U.Ya. Sedmalis), and the adhesion reactions of metals with polymers (M.M. Kalnin).

Numbers on separate subjects have been issued in recent years. Subject numbers of the journal were first issued in 1981 in connection with the 90th anniversary of G.Ya. Vanag and L.K. Lepin. The first and second issues of the journal for 1986 basically contained papers on organic and physical chemistry reflecting those directions which are developing in the LaSSR by the schools of the scientists mentioned. The third issue of this year dealt with a survey of research done by the chemical institutes of the Academy of Sciences of the republic in connection with the 40th anniversary of the academy. Such a publication practice enables the achievements in a specific branch of science to be reported better and promotes better effective use of scientific information. Efficiency is achieved also by means of publication of letters to the editor containing a brief exposition of the most interesting and important research results. The practice of transmission of cooperative results by prominent specialists of several collectives, including also those of other republics, promotes the acceleration of scientific and technical progress and the intensification of scientific research. The journal often publishes papers done beyond the boundaries of the republic on problems related to those being developed by Latvian scientists, and this also must promote the reinforcement of contacts and the acceleration of progress.

The subject matter of the papers reflects the progress which is characteristic of the chemical science of the republic both in the aspect of the development of new directions and also relatively the enrichment of research by modern physicochemical methods which are widely usable in the description of inorganic and organic substances. Thus, papers from the field of plasma chemistry achievements in bioorganic chemistry, and the synthesis and study of new types of polymers have appeared on the pages of the journal in the last 10 years.

A number of communications in the news item section have appeared in the period 1981-1985 in which meetings, symposia, and conferences which are being

Table 3. Numbers of Letters and Papers in the News Items Section by Years

Таблица 3

Количество писем и статей в разделе «Хроника» по годам

(1) Коллектив	1981 г.	1982 г.	1983 г.	1984 г.	1985 г.	1981— 1985 гг.	% от общего числа (2)
(3) Институт не- органической химии	9	11	7	11	6	44	34,6
(4) Институт органического синтеза	5	5	3	8	10	31	24,4
(5) Институт химии древесины	3	1	—	2	2	8	6,3
(6) По институтам АН ЛатвССР	17	17	10	21	18	83	65,4
(7) Рижский поли- технический институт	7	1	6	8	3	25	19,7
(8) Латвийский го- сударственный университет	5	5	5	2	—	17	13,4
(9) По ВУЗам ЛатвССР	12	6	11	10	3	42	33,1
(10) НПО «Биолар»	—	1	—	1	—	2	1,6
(11) Всего	29	24	21	32	21	127	—

Key:

1. Collective
2. Percent of the total number
3. Inorganic Chemistry Institute
4. Organic Synthesis Institute
5. Wood Chemistry Institute
6. By LaSSR Academy of Sciences institutes
7. Riga Polytechnic Institute
8. Latvian State University
9. By LaSSR higher institutes of learning
10. Biolar Scientific Production Association
11. Total

held in the republic are reported; the greatest number of publications (64.5 percent) have been submitted by staff members of the LaSSR Academy of Sciences.

The 27th CPSU Congress noted the course of the internal policy of the country directed toward the acceleration of social and economic development and scientific and technical progress, the provision of which poses great tasks for scientific workers, "the country has the right to expect discoveries and inventions which provide genuinely revolutionary changes in the development of engineering and technology" [4].

Meeting these tasks requires intensification of research in the field of basic sciences, and it is necessary to provide advanced rates of development and to accelerate the introduction of scientific development into production [5].

Scientific journals, which are the basic link providing efficiency in the exchange of information and the intensification of research, the acceleration of the introduction of advanced experiment and of methods of development, are called upon to set up their activity in such a way as to provide timely and quality publication of the most important achievements of Soviet science, by assigning top priority to scientific discoveries and by promoting practical implementation of new technical solutions.

The task of the editorial staff of the journal IZVESTIYA AKADEMII NAUK LATVIYSKOY SSR. SERIYA KHIMICHESKAYA, of reviewers, and of authors of papers by cooperative efforts is to improve constantly the level of publications, to enrich the information content of papers, and to provide efficiency in their publication.

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